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The Diagnosis of Helminthiasis in Farm Animals*

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Of the numerous species of parasitic worms which commonly occur in our domestic stock some are known to be the cause of diseases of the greatest economic importance, others are thought only to cause disease occasionally, and still others are considered to be almost completely harmless. Little or no definite information is to be found on the pathogenicity of the last two groups and we must leave the discussion of the diagnosis of diseases caused by these parasites until we have better information on the harm which they do. It is proposed, therefore, to confine this short paper to the discussion of the few definite helminthiases which commonly occur in stock in this country. These diseases are not very numerous, and are all included in the following short list :—

Strongylidosis or "red-worm disease" in horses ; parasitic gastritis, parasitic bronchitis or "husk," fascioliasis or "liver rot" and "gid" in ruminants ; syngamiasis or "gapes" in chickens and amidostomiasis or "gizzard worm disease" in goslings.

Evidence of the more or less definite nature of the diseases which these parasites are capable of causing is to be found in the existence of a generally accepted name for the disease, apart from the name manufactured by the parasitologist by adding the suffix "osis" or "iasis" to the name of the parasite.

This existence of a generally accepted name may be regarded as sound evidence for the pathogenicity of the parasite ; if a generally accepted common name exists then there is probably a definite disease entity to name and the associated common parasites are harmful : if no name exists, then the existing parasitse may not be harmful.

Perhaps we should not push this generalisation too far but it is interesting to note that there is no accepted common name for disease caused by adult tapeworm infestation, nor for ascaris infection. Both of these groups of parasites are thought by some parasitologists to be responsible for considerable loss to husbandrymen in one way and another, but other authorities feel less certain of their harmfulness and require further proof before advising the adoption of extreme measures for their control.

The positive diagnosis of disease caused by parasitic worms, even of the several definite diseases which have just been mentioned, is often a matter of considerable difficulty, and although we may all hope to learn something from a discussion of this kind I fear that my contribution may appear, in parts, to add to the difficulty of the procedure, rather than to simplify it.

So many advances have recently been made in technical aids to the diagnosis of helminthiasis, particularly concerning the recovery of eggs and larvae from the faeces, that the medical or veterinary practitioner would appear to be in a particularly advantageous position. The actual state of affairs, however, is very different, and anyone who sees much of worm disease among farm animals must frequently meet with cases where it is difficult to determine the part played by parasitic worms in the causation of the indefinite symptoms that may be exhibited.

A point which is not so generally appreciated as it ought to be is the difference between the mere determination of the presence of parasitic helminths and the diagnosis of helminthiasis.

Determination of the Presence of Helminths

The first essential in this procedure is to be able to recognise the eggs and the worms in macroscopical and microscopical examinations of the faeces, or of the intestinal contents, on *post-mortem* examination,

The technique of the examination of faeces for evidence of worm infestation has been greatly improved during recent years by the perfection of egg-concentrating and egg-counting methods. Refinements of one kind and another have been added to these, essentially simple, techniques ; controversies have sprung up over their relative merits and demerits, until there is now quite an extensive literature on the subject, and as a result of this, perhaps, one sees a marked tendency to exaggerate the accuracy and the value of the information which is to be obtained by their employment.

The danger of the application of these methods to the diagnosis of helminthiasis comes from the

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apparently definite nature of the data provided, either by the collection of large numbers of nematode eggs to be seen under the microscope, or by the interesting figures concerning the numbers of eggs present in a unit weight of faeces.

There is a tendency for the enquirer to be satisfied with these results and to go no further, and to reduce the process of diagnosis to some kind of formula based upon such observations.

The first of these aids to diagnosis to come into general practice was the flotation method of concentrating the eggs in the faeces. This method was first advocated as early as 1906 by Bass, who used a nine-tenths saturated solution of common salt, to make the eggs rise to the surface.

Calcium chloride was next used instead of common salt, then sodium acetate, water glass, and it was Sheather's suggestion that sugar might be used which popularised the method in this country. On account of the stickiness of the sugar solution, the ease with which some moulds grow in it and its high viscosity, retarding the passage of eggs upwards, I prefer to use salt solution. This has the disadvantage of crystallising on the slide, which, however, does not matter unless one wishes to keep the slides for an hour or two, or a day or two for further examination. Calcium chloride is perhaps most generally useful—being hygroscopic it will not crystallise, but as it is less readily available it is not likely to replace either salt or sugar for general use.

The method of carrying out a flotation test is thoroughly well known to all of you and there can be no point in my taking up your time with a description now. I might just mention, however, that a centrifuge is not necessary ; in fact, unless the special Clayton Lane centrifuge is available, I think it is better not to use a centrifuge at all.

In carrying out the test without a centrifuge one fills a short test-tube a little more than full with the mixture of faeces suspension and salt or sugar solution, and then places a microscope slide on the top of the tube, so as to exclude all the air, when the eggs make their way upwards through the liquid. In half an hour or more, the great majority have come to rest immediately underneath the slide, and may be removed along with the adhering drop of the liquid by a quick upward movement of the slide. Some 90 per cent. or more of the eggs may be obtained in this way for examination under the microscope.

Returning now to the application of the flotation technique for the diagnosis of helminthiasis, it is obvious that it may be put to great use as an aid to the determination of the kind of infestation, *i.e.*, as a qualitative test, but it is most important to remember its limitations, and never to lose sight of the way in which all evidence of the extent of infection is destroyed. This evidence can much better be obtained, even from a straightforward examination of diluted faeces, smeared on a slide.

The capacity of the flotation test for misleading the unwary was brought home to me on one occasion when I made a *post-mortem* examination of a dog after the flotation test on its faeces had revealed an ascaris infestation. The field of vision under the microscope had been literally filled with eggs, but the stomach and intestine of the dog was found to harbour only one female ascaris. The sight of so many eggs together is, doubtless, very refreshing to the diagnostician and may be accepted, with a sigh of relief, as irrefutable evidence of helminthiasis. Actually, however, the difficult question of the diagnosis of disease caused by worms is still to be considered.

The second important addition recently made to the technique for the diagnosis of helminthiasis concerns the perfection of methods for estimating the numbers of eggs per unit weight of faeces. Several different methods have been advocated, but I think that a method usually referred to as the Stoll method is the most generally useful veterinary work. The procedure is to weigh out 3 grammes of faeces, then to add 42 c.c. of water and make an even suspension by shaking well in a bottle, along with glass beads or shot. The suspension is next poured through muslin or through a coffee strainer to remove the larger particles. 0·15 c.c. is then measured out with a graduated pipette, or a McDonald automatic measuring pipette, which is much easier and placed on a glass slide. A $\frac{7}{8}$-inch coverslip is placed over the drop and all of the eggs are counted under a magnification of about 40 diameters, such as is obtained with a $\frac{2}{3}$-inch objective and No. 3 eye-piece. The number obtained, multiplied by 100, then gives the number of eggs per gramme of faeces.

In examining the faeces of carnivores it is advantageous to mix the faeces with decinormal sodium or potassium hydroxide instead of with water, as this will be found of great assistance in breaking up the mass and obtaining an even suspension.

In estimating the general level of infestation in a flock or herd I have found it very helpful to take samples of faeces of equal volume from a dozen or so of the animals concerned (measured roughly by filling an old spoon and scraping the top level with a spatula), mix them all together very thoroughly and estimate the number of eggs per gramme in the mixture. The result obtained will give a fair indication of the level of infestation of the whole group of animals.

The counting technique would appear to be the last word in precision, and when it was first introduced, its exponents thought that all the

shortcomings of other diagnostic procedures such as the flotation technique, would be supplied, and the difficulties of diagnosis be ended.

The next steps for the laboratory workers to take appeared to be quite obvious; first the numbers of eggs per gramme of faeces representing one female worm could be ascertained, then the ratio of males to females, and lastly the numbers of worms requisite for the production of disease for each species. A magical number of eggs per gramme could then be stated, for each species of parasite, by which the diagnostician could determine, with certainty, the presence or absence of helminthiasis.

Difficulties began to appear, however; first the obvious ones, and later those less obvious, some of which are still but little recognised.

One of the shortcomings of faecal examination for eggs in general might be mentioned here, *i.e.*, that the examination takes no account of immature parasites. This point should always be kept in mind when carrying out a faecal examination for helminthiasis. I once made a bad mistake in this connection when examining the faeces of adult cattle showing symptoms of acute pneumonia, for evidence of lung worm infestation; finding none and finding neither symptoms nor history to be suggestive of parasitic bronchitis I decided that there could be no connection with husk; *post-mortem* examination, however, revealed a very heavy infestation with immature *Dictyocaulus viviparus* which had evidently been acquired as a mass infestation some three or four weeks previously.

A second source of error in the counting technique originates in the variable nature of the intestinal contents and the rate at which they pass through the intestine. The egg count in sick animals is particularly prone to variation from this cause. Eggs passed by the parasitic worms are not diluted to the same extent where there is bowel stasis, and the count per gramme of faeces may be increased to five or six times the figure at which it would otherwise stand. On the other hand, a large amount of bulky food or the presence of diarrhoea has the reverse effect and the normal count may be reduced to the extent of six times what it otherwise would be.

The age and general state of resistance of the host also has an unexpected influence upon the number of eggs per parasitic worm found in the faeces and may depress the egg output of the female worms very considerably. This is one of the hindrances to the utility of the egg counting technique which has only recently come to light. Comparatively little is known about it at the present time but I have observed in parasitic gastritis caused by the smaller trichostrongyles that the number of eggs per gramme of faeces in adult sheep may be little if at all elevated above what is normally seen in healthy adults, although the numbers of worms carried may be very greatly in excess of the normal and sufficient to cause severe disease.

You may think that I have spoken at too great length on the difficulties and uncertainties which detract from the usefulness of faecal examinations in the diagnosis of helminthiasis. While appreciating the great value of these aids and while using them to the greatest advantage, however, we must be careful to keep the proper perspective and avoid the tendency to regard the results of faecal examination as the beginning and end of the diagnostic procedure.

Symptoms are of comparatively little assistance in the diagnosis of helminthiasis in grazing animals, being of a very undecided nature, and rarely more definite than the gradual wasting accompanied by an unhealthy condition of the skin, diarrhoea, and anaemia which are also associated with several other conditions. If these symptoms could be relied upon, indefinite as they are, things would not be quite so bad, but unusual infestations sometimes bring about very unusual symptoms; a severe infestation rapidly acquired may result in death within a few days, before there has been time for any wasting; death from acute pneumonia in sudden heavy infestation with *Dictyocaulus* has already been mentioned, it may also occur in sudden heavy infestations with *Ascaris*, and again, in severe infestations with species of *Trichostrongylus* sheep may pass only a small amount of dry faeces instead of showing the usual diarrhoea.

The diagnostician must, therefore, be prepared for unusual symptoms and cannot expect any very reliable guide in this direction. The history and attendant circumstances are, however, a most useful aid and it is well worth while to enquire into these most carefully. A knowledge of the life history of the parasites and of the factors which lead to their increase in numbers when applied to the circumstances of the outbreak of disease often gives a most helpful guide to the interpretation of the symptoms which are shown. A wasting disease, for example, which appeared in only one or two members of a flock or herd would probably be due to something other than gastro-intestinal or pulmonary helminthiasis, which would be likely to appear more or less simultaneously in a majority of those animals of a susceptible age which had been exposed to infection.

The generally recognised phenomenon of age susceptibility to helminthiasis is also a useful guide; this often brings about a state of affairs in which the adults are seen to be perfectly healthy although grazing on the same pasture along with younger animals which are dying of worm infestation.

A history of overcrowded grazing conditions fits in with a diagnosis of disease due to parasitic worms; and in sheep, folded on green crops, the employment of a bad system of penning, or a rotation of crops which provides for two successive green crops eaten off the same ground by sheep after an interval of only six or eight months' duration.

Considerations of this kind read in conjunction with the results of faecal examinations will usually lead to a satisfactory diagnosis, but evidence of both kinds is necessary, and the laboratory egg counter is often in no better position to make a diagnosis than is the man in the field who collects the samples for examination and sees the animals and their environment. Of all the evidence, however, nothing is quite so useful as a *post-mortem* examination if properly carried out on one or two members of the herd or flock. Red worms in horses, husk worms and liver flukes in cattle or sheep, are easily seen; the twisted wireworm in the fourth stomach is also comparatively easily seen, but detection of the smaller stomach worms is much more difficult, and unless the examination is properly carried out with screens and glass dishes the thousands of parasites possibly present are likely to be missed. The collection and enumeration of these has been dealt with previously (*Vet. Rec.*, May 5th, 1934). Such a detailed and careful examination as was there described is not always necessary, but where the smaller trichostrongyles are concerned it is very difficult to form a clear idea of the extent of an infestation without making some such estimate of the numbers of worms present.

These procedures all take time, and some are rather too highly specialised to become part of the general routine in veterinary practice. Although they may at times be dispensed with they are not only useful but necessary for the proper diagnosis in many instances, and on account of the poisonous and dangerous nature of many of the efficient anthelmintics, should always be employed before prescribing the use of these drugs in valuable animals.

Entries for the dairy show of the British Dairy Farmers' Association to be held at the Royal Agricultural Hall from October 19th to 22nd number 2,104, compared with 2,100 last year. The Council of the Association has decided that the show shall be open only to animals from licensed tuberculin-tested or attested herds, and to cattle or goats which have passed the tuberculin test within four months of the opening of the show.

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Remittance of land revenue and *tagavi*, a veterinary hospital for rural people, where their cattle will be treated free, and the release of three prisoners were the gifts to his subjects by the Nawab of Cambay announced at a Durbar held on July 27th in celebration of his 27th birthday.

The Veterinary Record

October 2nd, 1937.

The Inspection of Meat in Great Britain

THERE is some uncertainty in the minds of veterinary surgeons as to the future of meat inspection in England and Wales. The responsibility for the inspection of meat still lies with the local authorities. It has in no way been altered legally by the passage of the recent Agriculture Act and the establishment of a State Veterinary Service. In Scotland the veterinary surgeon is legally recognised as the meat inspector. In England and Wales it is usual to appoint him as a sanitary inspector before he can function as a meat inspector. This procedure in itself naturally acts as a deterrent to the employment of veterinary surgeons in the conduct of a task for which only they are adequately trained. The services of the veterinary surgeon have, during the past few years, been utilised more and more by the large towns and municipalities to safeguard the quality of their meat supply. The future of these officers will presumably be unchanged by the formation of the present centralised veterinary service, but where the municipal veterinary officer has other functions to perform, then his position may be affected. It is unlikely that the changes to be made will strengthen the present service for meat inspection; in fact, a weakening of this service might seem to be more likely to result from the present reorganisation of the veterinary services of the country. Lest this development should suffer a check, we must watch carefully for any change likely to affect the position and duties of these officers.

The present state of meat inspection in this country whereby veterinarians are only employed in large cities and a few other centres must be admitted unsatisfactory. The Government might reasonably have taken the opportunity, under either the Livestock Act or the Agriculture Act, to establish a nationally co-ordinated veterinary service for the inspection of meat and meat products, including bacon. From recent leading articles in the medical Press it would appear that both the medical and the veterinary professions agree that the inspection of meat is the responsibility of the veterinary profession.

In most other progressive countries, *e.g.*, Canada, the United States of America, the Irish Free State, Northern Ireland, Germany and many others, this State Veterinary Service for meat inspection has long been established. In Germany, not only is inspection carried out both *ante-* and *post-mortem* at the abattoir, but meat and meat products are subject to veterinary inspection in the factory, the shop, the hotel and even in the boarding house. Furthermore, all fish, crustacea and molluscs destined for human consumption are similarly examined. It is difficult to understand why this country should be so backward in this matter when it is remembered that it is largely because of the insistence of the Government of Great Britain that countries producing large quantities of meat have established efficient veterinary examination of their products before export.

Developments, both in this country and elsewhere, foreshadow an extension of the veterinary service for the inspection of meat and meat products. We may confidently hope to see such a branch of the State Veterinary Service established before the lapse of many years. Meanwhile all changes affecting the duties of veterinary officers engaged in public health work will require very careful watching by the profession. These officers may rest assured that if the need should arise they will have the wholehearted support of the profession.

CENTRALISED ABATTOIRS

Mr. D. Powell, Chief Sanitary Inspector of the Bedwelty Urban Council, speaking at the Conference of the Sanitary Inspectors' Associations at the Dome, Brighton, said: "With centralised slaughter abattoirs, and all meat marked free of charge, the public would get what they are entitled to—meat carrying a guarantee of safety. Our livestock is the envy of the world, yet in this country the methods employed to examine stock intended for meat are below those of many other nations. I hope the Conference will take a definite line, and declare that public abattoirs are absolutely essential." He went on to say that many local authorities showed no signs of becoming alive to the importance of uniformity in meat inspection. The large number of unnecessary private slaughterhouses scattered throughout the country and the limited number of inspectors was a serious impediment to adequate administration. There were some 16,000 private slaughterhouses in this country; obviously the closing down of these and the provision of well-constructed and properly administered public abattoirs would facilitate the adequate inspection of meat, and ensure hygienic conditions for slaughter and dressing of carcases.

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The Ayrshire breed again heads the list of the Highest Milk Recorded Cows and Heifers in Scotland as officially recorded by the Scottish Milk Records Association, whose annual report has recently been published.

CLINICAL COMMUNICATIONS*

A Method of Feeding in Trismus

E. W. ASCOLI, M.R.C.V.S.
BIRMINGHAM

A seven-year-old mare, in average bodily condition, showed well-marked symptoms of tetanus, including that of trismus. She was first seen on the fourth day, when she was down and unable to rise without assistance, owing to the extension of the hind limbs.

Prehension and mastication of food were impossible and attempts to pass the stomach tube proved fruitless as she appeared to be unable to swallow it. It was therefore decided to attempt oesophagotomy and the injection of liquid food directly into the stomach.

The operation was performed as follows :—

Under local anaesthesia, a three-inch incision was made longitudinally in the skin of the jugular furrow on the left side, at the junction of the middle and lower thirds. Search was made for the oesophagus in the fascia, using as a guide the pictorial cross-sections given in Sisson's anatomy and in Dollar's Surgery. The oesophagus was eventually discovered, but it was not easy, owing to the inexpertness of the operator. When found, a half-inch incision was made in it longitudinally, and through this, a long, thin-walled rubber tube ($\frac{3}{16}$ inch diameter) was inserted and pushed down to the stomach. This was left *in situ* continuously.

Liquid food was then pumped in, a stomach pump being used.

Flour, oatmeal and linseed gruels were tried, but proved unsuitable, as they clogged the pump. Ground rice and cane sugar, made into a porridge with water, was found to be satisfactory, and of this, two buckets were injected three times daily. This represented about twelve gallons of water, six pounds of rice and six pounds of sugar. The mare obviously enjoyed her meals, and it was interesting to observe the copious salivation which occurred when the food was injected, although the sight and smell failed to produce it. The excessive ingestion of water resulted in diarrhoea and it is suspected that the full food value of the rice and sugar was not obtained. Relatively slight loss of bodily condition occurred while so fed.

Movements of the lower jaw began to return on the sixteenth day and the tube was removed and the feeding discontinued. It was hoped that the wound might begin to heal before mastication and swallowing began. This was a

*Cases seen by the author while in practice at Barnstaple, Devon.

mistake. She was unable to feed adequately in a normal manner for more than a week later and the injections had to be recommenced. During the interval she lost condition rapidly.

After four weeks the symptoms had nearly disappeared and the mare was able to masticate and swallow easily. The loss of food through the oesophageal incision (which was now a circular hole, fixed in shape by rigid masses of granulation tissue) was considerable. During drinking the fistula was stopped by one's finger.

The fistula closed in two months but soon formed an abscess, which burst, a 1½ inch fistula remaining. This was finally closed by inserting into it two small gelatine capsules containing copper sulphate. The caustic caused necrosis of the lining membrane and the inflammatory swelling produced brought the new surfaces in contact.

She commenced work three months after the onset and would have done so at two months but for lameness due to a bruised sole.

In addition to the above treatment there were injected (I think in two daily doses) 20,000 I.U. of tetanus antitoxin, intravenously and intramuscularly.

Twelve months later the owner reported that the mare's neck had healed satisfactorily. Once she was seen to choke but appeared to clear herself by coughing.

When occasion arises to employ this method again, a narrower tube will be used and a dextrin-glucose mixture (costing approximately 6d. per lb.) will be given instead of rice, as it is partially digested and concentrated gruels made from it are more fluid. The food will thus be less watery, and protein will be supplied in the form of low-temperature dried blood meal (W. & J. Dunlop).

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Papilloma of the Reticulum of a Calf

E. W. ASCOLI, M.R.C.V.S.
BIRMINGHAM

Subject.—Eight-months-old steer.

History.—There had been tympany, continuous arching of the back and inappetence for the past six weeks.

Examination.—The calf's back was markedly arched, producing a curiously deformed—indeed a ludicrous—appearance. There was great bilateral distension of the abdomen. The rumen was tympanitic and much distended: the internal pressure, however, was low, and it appeared, therefore, to be permanently dilated. Its movements were only slight.

Treatment and Progress.—A simple digestive mixture was administered, but as no improvement resulted, the calf was slaughtered three weeks later.

Autopsy.—There was dilatation of the rumen, its volume being about half as great again as the normal. In the reticulum was a papilloma, cauliflower-like in appearance. The maximum diameter of the growth was six inches and its base measured two inches. The papilloma had, of course, obstructed the passage of ingesta and gas from the rumen.

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Sarcoma of Membrana nictitans of a Calf

E. W. ASCOLI, M.R.C.V.S.
BIRMINGHAM

Subject.—A four-months-old bull calf.

History and Examination.—A reddish growth, the size of a hazel nut, was seen on the edge of the membrana nictitans. It had been observed for the first time 14 days previously and was growing rapidly.

Diagnosis.—Carcinoma.

Treatment.—It was decided to remove the growth and as much of the membrane as possible. The corneal surface was anaesthetised by swabbing with 2·25 per cent. ethocaine hydrochloride and the substance of the membrane by injection, using an intradermal needle, the membrane being drawn outwards to the fullest extent possible. It was then cut off with curved scissors.

Course.—Recovery was uneventful and the calf was still normal twelve months later.

The specimen was sent for histological examination and was reported to be a spindle-celled sarcoma (Dr. T. Hare).

LAMENESS IN POLO PONIES

Mr. E. F. Peck, B.V.Sc., M.R.C.V.S., of the Veterinary and Agricultural Department, Burao, British Somaliland, writes: "It is well known that small polo ponies in the tropics often have to carry excessive weights at speed, and that lameness is common. Provided that the feet are kept regularly trimmed the application during play of half an Elastocrepe bandage (T. J. Smith and Nephew, Ltd.) beneath the polo boot and next to the skin will greatly decrease the number of ponies lamed. Supporting bandages of this type are of course often used in other connections but not commonly for the purpose now described.

"If a sprain has occurred, a very useful adjunct to treatment is the inexpensive 'Neda' (Boots) massage instrument which consists of four rotatable rubber spheres, so placed as gently to seize, lift and compress the skin and subcutaneous tissues as the instrument is rolled up the leg."

ANNOTATION

The Sheep Blowfly Problem in Great Britain

Introduction

For many centuries the sheep blowfly has been recognised as a pest of sheep, and sheep owners and veterinarians alike are familiar with its ravages. But it is only within recent years that its activities in Britain have increased to such an extent as to form an important menace to the sheep farming industry.

That "strike" in sheep, or sheep myiasis caused by the sheep blowfly, is no new problem may be gathered from the fact that Fitzherbert and others in England and the Borders of Scotland were familiar with the symptoms of attack by maggots as long ago as the early part of the sixteenth century. Numerous references to the pest occur in the literature during the succeeding years, but until the rapid increase of sheep farming and of intensive farming practices in the present century the parasite does not appear at any time to have assumed epizoötic proportions. Since sheep farming on an extensive scale was introduced into the Highlands from the Borders of Scotland only in the second half of the eighteenth century, we find little or no mention of sheep myiasis there until the beginning of the nineteenth century. Since then, increasing by a series of epidemics, each of which left the problem more acute than it had been previously, it seems to have become a serious problem in Scotland. A major outbreak occurred during 1897-1900, when it was observed that the geographical distribution of the fly in Scotland had become widespread. Another important outbreak occurred during the years 1931-34, during which a very marked increase in the severity of strike and in the extent of the area affected was observed. The cause of these outbreaks and of the gradual spread in the geographical distribution of the fly during the intervening years is, as yet, not properly understood, but in both epidemics it was noticed that there was a tendency for the fly to invade and strike on the high-lying grazings which, previously, had been free from trouble.

As in the Highlands of Scotland, so in Wales, sheep rearing assumed extensive proportions much later than in England and the Borders, and references to the activity of the blowfly are not found until the latter part of the nineteenth century. At present the problem of sheep myiasis appears to be equally acute in England, Scotland and Wales.

In the other countries, especially Australia and South Africa, where blowfly attack constitutes a serious menace to the sheep farming industry, the problem of control has received, for many years, the attention of several research workers, with the result that much information dealing with the causes and control of sheep strike has emanated from these countries. Helpful as this information has been, it was realised that much of it could not be applied to the problem as it existed in Britain, and, with the ever-increasing ravages of the parasite, the need for control measures assumed such prominence that the problem began to receive the study due to it. About 30 years ago the first real attempt to deal with the problem was made by Stewart MacDougall, whose patient and painstaking work paved the way for subsequent investigations. The problem, however, received little more attention until the beginning of the present decade, when workers in many parts of Britain took up in earnest the investigation in its various aspects, and within the past few years valuable additions to our knowledge of the habits of the flies concerned, of the nature and causes of strike, and of control measures, have been made. The purpose of this annotation is to collect the information, widely scattered in numerous scientific publications, which we now possess on sheep myiasis, and to present a résumé of such knowledge as at present exists. Readers who desire a more detailed account of the nature, epidemiology and control of sheep myiasis in Britain will find a mass of up-to-date information in a recent paper by MacLeod (1937).

It is of interest to note that in most countries the pioneer work was carried out by entomologists, but that, recently, the problem has proved to be of such complexity that an attack on it has had to be made from more than one angle, with the result that bacteriologists, biochemists and research workers in other fields have been co-operating towards a satisfactory solution.

The Nature of Strike in Sheep

Under the term *myiasis* are included all affections caused by dipterous larvae among vertebrates, more particularly mammals, and it is often possible to distinguish between myiasis induced by truly parasitic larvae and that brought about by saprophagous forms which only follow on diseased conditions, wounds, and where there is bacterial infection. It is also possible to group myiasis, from the clinical point of view, into (1) cutaneous myiasis, which includes not only blowfly attack on sheep, but also parasitism by warble flies and others; (2) myiasis of the cranial (orbital, nasal and auditory) cavities caused by the sheep nostril fly larva, etc.; and (3) myiasis of the digestive tract, exemplified by *Eristalis*, the "rat-tailed

maggot" which occasionally produces gastric disturbances in pigs. Thus, it will be seen that strike in sheep, which is a form of cutaneous myiasis, is not peculiar to that animal but results from a habit common to many flies which, in their larval stages, parasitise flesh.

Several different theories have been put forward in an attempt to explain how and why the sheep blowfly, normally a carrion fly, acquired the habit of striking the *live* sheep. Considering the cutaneous myiasis-producing flies as a whole, there appear to be three main types of flies concerned. Type I is attracted by the odour given off from the raw flesh and newly spilled blood of a wounded, but living, animal, so that this type strikes wounds, and is represented by such forms as *Chrysomyia bezziana*, which attacks cattle, in South Africa, and *Cochliomyia hominivorax*, which occurs in tropical and subtropical regions of the New World. Type II is attracted by more than one odour or by a combination of odours, and it will attack not only fresh wounds but also decomposing tissue and even the unbroken skin, the hairy covering of which, soiled by faeces or urine, gives off ammoniacal or other odours of decomposition. This type is represented by a number of flies which vary in different countries, and includes *Lucilia sericata*, the common sheep maggot fly of this country. Type III flies are attracted by the odours of decomposition only and are able to attack the live animal provided myiasis already exists or diseased tissue is present; several kinds of flies, such as species of *Sarcophaga*, may be referred to this type. So far as Britain is concerned, there are no Type I flies represented, and myiasis, where it occurs, is the result of the activities of flies belonging to Types II and III, with which the sheep farmer is directly concerned.

By dismissing the Type I flies, which do not concern us, we find that there remain several flies belonging to Types II and III which are equally capable of development in carrion and on the live animal. With regard to the development of blowfly larvae in carrion, workers in Australia have observed that a carcase passes through a number of stages of decomposition and mummification and is, in each succeeding stage, more suitable for the development of certain species of larvae than for others, and they have found it possible to recognise primary, secondary and tertiary blowflies which can be similarly grouped in respect of their activities on the living animal.

The primary fly is one which can, of its own accord, initiate an attack on the live animal by laying eggs on it and by the ability of the larvae to sustain themselves on the body of the animal. The maggots of such flies develop mainly during the autolytic and early bacterial stages of decomposition. The secondary fly cannot normally initiate an attack on the live animal, but, taking advantage of the suitable conditions set up by their larvae, it follows the primary flies. Thus the attack of secondary flies is frequently of extreme importance because they can greatly increase the severity of an existing strike. Although a secondary fly is normally unable to initiate strike, a primary fly can, and frequently does, assume the rôle of a secondary fly by following up the attack of another species of primary fly and taking quick advantage of it. A tertiary fly is of little economic importance in connection with myiasis and is only capable of taking part in the end-stages of an attack on the animal when the partially dried and matted wool and dried exudate of wounds provide a suitable medium for development.

One can, therefore, consider myiasis, due to primary, secondary, and the unimportant tertiary flies, as being merely variations of the carrion-infesting habits which have resulted from an abnormally high sheep population and from an unnatural balance between live animals and carcases which at present occurs in the field.

Species of Flies Involved in Britain

It seems to be an accepted idea amongst many farmers and sheepmen that there are at least two species of flies involved, one which has maggots that tend to burrow into the skin, and the other whose larger larvae wander away more readily, or one which attacks sheep in the early summer and another in the late summer and autumn. This belief has not been substantiated, because by surveys and the experimental breeding out of maggots from infested live sheep and the subsequent identification of the adult flies, it has been established that, with very rare exceptions, only one species is involved. This is *Lucilia sericata*, the "Greenbottle" or "Sheep Maggot fly." The belief that two species are involved may have arisen from the change in the habits of the larvae in their different stages or from the appearance of the larvae at different times of the year as the result of seasonal changes in strike incidence. *L. sericata* is a primary fly and the most important striking species in this country; it is responsible for most body and breech strikes and occurs throughout the fly season.

Amongst the exceptional cases mentioned above are included *Lucilia caesar*, *L. illustris*, *Phormia terrae-novae*, *Calliphora erythrocephala*, *C. vomitoria* and *Muscina pabulorum*.

Although relatively uncommon, *L. caesar* has been recorded from cases of sheep strike in western Scotland by MacLeod (1937), in south-west Scotland by Haddow and Thomson (1937), in Wales by Maldwyn Davies and Hobson (1937) and also in England by MacLeod (1937).

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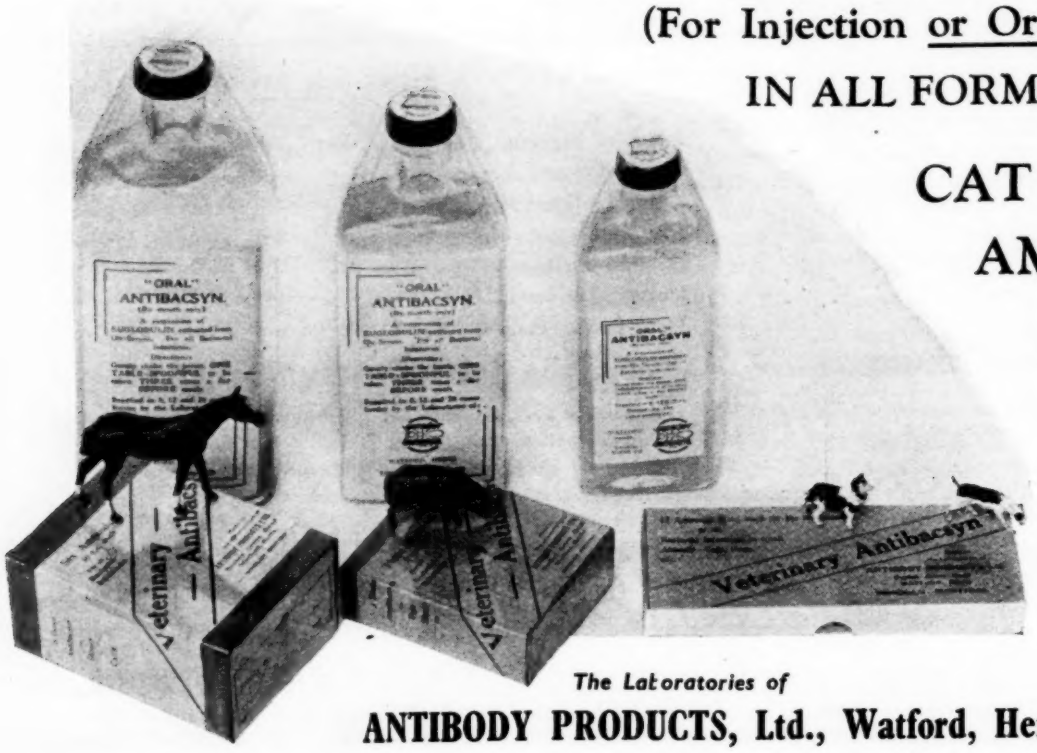

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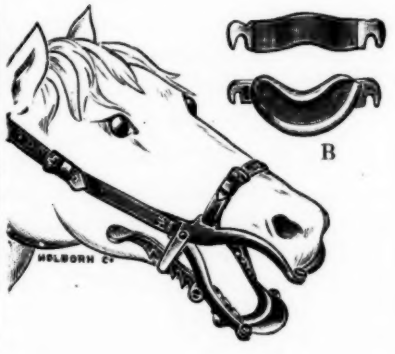

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Whether this species can initiate strike or occurs only as a secondary species in nature is at present obscure, but it should perhaps strictly be classed as a primary fly owing to its ability to produce strike, under experimental conditions, on healthy sheep. The same may be said of *Phormia terrae-novae*, which has been recorded from sheep by MacLeod (1937) in Mull and western Argyllshire and by Haddow and Thomson (1937) in various parts of south-western Scotland. MacLeod's observations on *P. terrae-novae*, in the areas from which it was recorded, show it to be an early summer fly attacking black-faced sheep in long wool, on which it produced strikes on various parts of the body, including the throat, loins and breech, and that it appears to act as a primary blowfly causing strike on areas where the wool is relatively clean.

Calliphora erythrocephala, the "Common Bluebottle fly," is also a relatively uncommon pest of sheep and has been taken either following on or coincident with *L. sericata* in almost all, if not the whole, of the cases of strike in which it has been recorded. It appears to act, in Britain, as a secondary fly, and Radcliffe (1935) suggests that it can act only in this capacity, and is unable to live either on healthy sheep or newly broken skin because of a limited temperature tolerance in its early stages. The closely related *C. vomitoria* has been recorded by MacLeod (1937) and by Haddow and Thomson (1937) from sheep in Scotland, where it appears in the rôle of a secondary fly. The latter authors have also recorded the presence of *Lucilia illustris* and *Muscina pabulorum* on sheep in south-west Scotland, where they caused secondary myiasis; there were three cases of infection with the former fly, which the authors mention as being not so common as *L. caesar* but fairly well distributed in the west of Scotland, and also three cases of infection with the latter fly.

Besides these flies there are other species, especially species of *Fannia*, which are concerned in sheep strike and which by feeding, as adults, on the blood and serous exudate of the wounds, aggravate the already existing sores produced by primary and secondary maggots. Their continual activities in the region of the lesions so irritate the animals that they attempt to bite and rub the affected parts and so rapidly increase the area of the wound. These sucking flies constitute a serious menace to the recovery of the sheep because, in the absence of any suitable repellent dressing which will also allow of healing, they contrive to keep the lesion open and continuously attractive to the sheep maggot fly.

How the Blowfly Attack Develops

Although the life-history of *Lucilia sericata*, which is almost exclusively the sheep maggot fly concerned in Britain, has been studied by many investigators, and is now well known, it should be noted that there is a considerable difference in the time taken for the development of the various stages according to whether development is on the live animal or on carrion. In order properly to understand subsequent remarks a brief description of the development on the living sheep is here intercalated.

The female fly must obtain a meal of protein before she can proceed efficiently to lay eggs; if this is unobtainable for more than ten days her ovaries will not subsequently develop. Following this meal, pairing and fertilisation take place and the fly starts to lay her eggs in batches of from 50 to about 150 at repeated intervals of two to three days. This occurs some five or more days after her emergence from the puparium and a single fly may lay over 2,000 eggs during its life, but it appears probable that many of the later eggs are unfertile. Although the factors affecting the occurrence of strike will be discussed later, it should be observed here that the gravid female flies are definitely attracted to a particular animal and select a particular spot on the sheep in which to oviposit; they do not lay eggs indiscriminately on any sheep or on any part of the animal: in fact, the fly spends some time, varying from a few minutes up to half an hour, exploring the fleece until a favourable site is found and sometimes she may even penetrate the wool to within half an inch of the skin before starting to oviposit, so that normally the eggs are laid deep in the wool. Oviposition occupies up to half an hour and the fly may be so persistent in her efforts that she will return to the selected site to continue egg-laying even when disturbed in the process.

Hatching of the eggs depends on a number of factors, such as the depth and type of the fleece, the position of the eggs relative to the skin, the climatic conditions and, especially, on the humidity of the wool. Apparently the site must be almost saturated with moisture before development will take place and under such suitable conditions hatching occurs in about nine hours, although the time varies within limits of a few hours. It quite commonly happens, however, that unsuitable moisture conditions are present, with the result that eggs may fail to hatch, or if they do, the larvae quickly dry up and die. Climatic conditions thus play their part in the development of attack and it does not follow that, during dry weather when few sheep show signs of being struck, the fly is absent.

The newly hatched maggots, which keep together and form a moist cluster, move down the wool fibres to the surface of the skin and there crawl about rapidly, causing an irritation which results in an inflammatory reaction. This gradually develops into an open sore and the larvae feed on the serous exudate from this, although they are also capable of living on the exudation of serum from the inflamed region without actually penetrating the skin. The first moult occurs in about twelve hours and the second in about 24 hours and the third-stage larva may be fully fed by the end of the second day in summer. On the sheep the period of development varies, however, and whereas it may require a period of 83 hours for them to complete their development when feeding is mainly on the serous exudate, if the skin is quickly penetrated, the maggots may be fully fed in about 70 hours.

Maldwyn Davies and Hobson (1937) point out that a severe attack seldom originates from a single cluster of eggs but that the excreta of the larvae hatched from the first batch of eggs, which is particularly attractive to gravid female blowflies, attract further flies which oviposit near the original feeding larvae. The maggots from the subsequent clusters of eggs find favourable food present on hatching and soon aggravate the condition and quickly cause the attack to spread and become acute. Hence one may find maggots of different ages and sizes on the same animal and in hot weather, where the blowflies are numerous, the extension of strike may be so rapid as to cause the death of healthy sheep within a week.

During the active, feeding period the larvae tend to keep close to the skin but, on becoming fully fed, they crawl about and pass out of the fleece to fall on the ground to pupate. Having reached the ground, the larva rapidly enters the soil and after a prepupal or wandering period, which lasts three or more days, it forms a reddish-brown, somewhat barrel-shaped puparium, about a quarter of an inch long, within which it pupates. The prepupal period, depending upon the conditions of the soil into which the larva has fallen, may vary considerably and may extend for months. Under ordinary summer conditions the pupal stage lasts about 15 to 21 days, depending upon the soil temperature. The adult seldom emerges in under eight days, although exceptional cases of a pupal period of three days are known. In the autumn, however, the prepupal period may extend till March, when the larva comes to the soil surface to pupate and normally the blowfly hibernates as a fully fed larva in the soil.

When the adult fly emerges from the puparium it requires water and quickly dies under dry conditions. If successful in finding this, in the form of droplets of dew, it proceeds to search for some form of liquid food which, in the case of the female, must be some form of protein in order to develop the ovaries. The flies are much more active in bright, sunny weather, especially during the forenoon and early afternoon, than in dull, cloudy weather even though it is warm. They dislike wind and frequent the sheltered grazings in the neighbourhood of woods. In open and hill country, bracken, heather and the long vegetation of hedge bottoms offer excellent shelter. In Britain it is possible for four successive generations of flies to occur within a year.

Factors Influencing the Occurrence of Strike

Breed of Sheep.—It has been shown that there is considerable variation in the susceptibility to strike amongst the various breeds of sheep and from work in Australia and elsewhere it appears that, of all breeds, the Merino is especially susceptible. In Britain, MacLeod (1937) points out that the Corriedale appears to approach most nearly to the Merino in its susceptibility. From observations, near Stirling in June, 1935, on experimental animals, he gives the relative susceptibility of different breeds as follows: Percentage of strikes on Corriedale, 50; on Lincoln, 28; on Romney Marsh, 17; on Shropshire, 14; on Halfbred and Greyface, 7; on Shetland, 0. In another experimental flock consisting of Hampshires and crosses between half-bred ewes and Hampshire and Suffolk rams the same observer found that the crosses were less susceptible than the pure Hampshires. In yet another instance MacLeod was able to obtain comparative data on the relative susceptibility of the Cheviot and Blackface, the two principal hill breeds in Scotland, and found the incidence of strike in Blackfaces to be 8 per cent. and in Cheviots under 3 per cent.

With regard to the absence of strike in the Shetland breed mentioned above, Miller (1935) noted amongst certain experimental animals during 1928 and 1929 that the percentage of strikes among white-woolled sheep varied between 15 and 20, but among brown-woolled sheep and especially among the pure-bred Shetlands it was less than 0·5. At that time Miller came to the tentative conclusion that for some reason the brown colour of the wool of the Shetland was unattractive to the fly rather than that it was actively repellent; MacLeod considers that this immunity is not due simply to the dark colour because he was able to get strike both naturally and experimentally on a black-woolled Hampshire.

Maldwyn Davies mentions that the Wiltshire breed and its crosses are rarely attacked and considers this is probably due to the hairy nature of the fleece and to the absence of any thick wool, both of which permit of rapid drying. He also found that the Border Leicester

was comparatively insusceptible but the Southdown was highly susceptible, while the Welsh breed, having a hairy region around the breech and under the tail which made it less subject to attack than some other breeds, was more or less intermediate in position.

It would appear from the foregoing observations that the introduction of Cheviot or Border Leicester blood tends to diminish the susceptibility to strike of Down breeds.

Age of Sheep.—Some observers consider that there is a greater incidence of attack among lambs than in older stock, while others maintain that the reverse holds. As MacLeod points out, it is difficult to assess the relative susceptibility to strike in lambs and adults because of the interplay of other factors; he mentions that adults are susceptible before shearing and at a time when lambs do not usually carry sufficient wool to allow of strike developing, whereas soon after shearing adults become relatively free from strike and lambs more prone to be attacked. His conclusion is that strikes tend to be more numerous in adults than in lambs, in so far as hill farms are concerned.

Individual Susceptibility.—It has been shown experimentally that the attraction of sheep for blowflies varies considerably between one animal and another and that this difference in susceptibility of individual animals exists within the same breed. The effect of this inherent susceptibility, the precise nature of which is at present obscure, on the general incidence of strike appears to be slight.

At the same time it has already been pointed out that the flies do not lay eggs indiscriminately on any sheep, so that strike is not a matter of chance but in every case there is the development of an area of susceptibility. Such a site may become attractive through soiling with the urine or moist faeces, "scalding," or pruritus of the unprotected skin of the perineum; most breech or rump strikes probably occur from these causes. In the case of body strikes, which occur on unsoiled wool, it appears that certain wool conditions predispose to attack. The condition known as "water rot" or "wool rot," which is the result of bacterial activity in the wool, has been found, invariably to precede body strike in Australia, and Maldwyn Davies and Hobson (1937) point out that there is evidence that in Welsh sheep, at least, this condition predisposes to attack. In Britain, however, a common cause of body strike is the presence of extraneous organic matter in the fleece.

Climatic Factors.—It has already been mentioned that the flies are most active in bright, sunny weather when there is little wind and conditions are warm. Also, strikes occur more frequently during and following damp weather when conditions in the fleece are suitable for the survival and development of blowfly eggs and larvae. It has previously been pointed out, however, that the absence of strike during dry weather does not of necessity indicate the absence of the fly but rather that there have been probably many instances of unsuccessful development of eggs after oviposition owing to the dry fleece conditions. There is experimental evidence to show that blowfly eggs and larvae require, at the temperature of the animal's body, over 90 per cent. relative humidity if they are to develop, and, in this connection, Maldwyn Davies and Hobson have indicated that the humidity at the base of the fleece of healthy sheep may be surprisingly low, about 40 to 70 per cent., even under showery conditions, so that it is normally unsuited for the survival and development of the maggots. Hence the conditions necessary for the development of an attack are more likely to occur amongst sheep on pastures with a luxurious growth or where there is much bracken, long heather and so forth and where their fleeces are kept saturated by contact with the wet vegetation than amongst animals pastured on shorter vegetation which allows the fleece to dry out more quickly.

Again, the occurrence of strike may be governed by the physical nature of the wool; dry conditions in the fleece probably result more quickly in those of a hairy nature and where there is an absence of any thick wool. In this connection the foregoing remarks on the breeds of sheep and their relative susceptibility must be borne in mind.

The seasonal incidence is, to some extent, linked with the climatic conditions, and suitable weather for fly activity is normally found from the beginning of June to the end of September, although cases of strike have been recorded as early as April and as late as November. During the normal strike period MacLeod recognises four phases of strike incidence, the limits of which depend upon the type of sheep farming practised. Thus, in the Highlands, the first phase occurs during June, when almost all strikes are on unclipped adult sheep and when the lambs are not yet susceptible. The second phase starts about the end of June or in early July, when the adults are clipped and when neither adults nor lambs carry a sufficient coat to render strike prevalent. This phase gradually gives place to the third one towards the end of July, when the lambs become more susceptible and the number of cases of strike in these animals begins to increase. As this phase passes the strike incidence in adult animals also begins to increase until, in September, there occurs the fourth phase, when lambs and adults are both susceptible and when both show strikes. This last phase exists until the onset of cold weather, which brings the fly season to an end.

The Problem of Control Measures

It must be remembered that sheep are not the only, in fact probably not the principal, source of food for the maggots, which have essentially a carrion-infesting habit, so that the flies which develop on the living animal represent a comparatively small proportion of the total blowfly population. Hence the ideal and most logical method of control would be to protect the sheep and prevent them from attracting the blowflies and not to concentrate on attacking and destroying the pests. Valuable work in this connection has been carried out in Australia, where the general susceptibility of a flock to crutch strike, which is an inherited character and can be recognised, has been reduced by selective breeding without serious loss in wool quality. The same workers have also found that by the surgical removal of the side folds, by Mules' operation, the breech can be opened up so that urine soiling is reduced and the susceptibility to strike decreased.

Apart from selective breeding to avoid crutch strike, attack in the region of the breech can be avoided by crutching. This operation appears to be of undoubted value; in fact, it is probably one of the most widely adopted preventive measures and is one to be encouraged. The operation, to be effective, has to be carried out frequently and thoroughly and involves the clipping away of all wool around the tail, down the hind legs to the hocks and between the legs; the operation tends to promote dryness in a region very liable to be affected.

Amongst the mechanical methods of control is included the trapping of flies, but the available evidence, experimental and otherwise, does not allow of a definite opinion being expressed as to the value of this procedure. Where properly carried out it is held by some to result in a definite reduction in the fly population and in the strike incidence, but there are others who consider it to be of no practical value. There is, however, no evidence to show that trapping should not be carried out. It is emphasised by most workers that, to be of any practical value, the bait to be used must be selected with care so that it has a specific attraction for the sheep maggot fly.

Another problem in the control of the fly is that of carcase disposal. The most satisfactory method is burning the carrion, but where such factors operate as prevent this it is considered safer to bury deeply all dead animals at the earliest possible opportunity and not to allow them to become blown. MacLeod points out that carcases are seldom buried deeply enough to prevent larvae, which may be in it, from returning to the surface when fully fed, and mentions that maggots have been known to pupate six feet below the soil surface and adults to reach the surface from pupal cases at depths of over four feet. Haddow and Thomson (1937) also mention that, during their investigations in south-west Scotland, they found the methods of burying carcases to be primitive and inadequate. Another argument for the early disposal of carrion is that the newly emerged female flies are prevented from obtaining the protein meal which is essential for the development of their ovaries. It is advocated that, before burial, the carcase should be rendered lethal by being liberally sprayed with a strong arsenical solution or sprinkled with arsenical sheep-dip powder so that, if blown prior to burial, larvae which hatch will be killed.

From the chemical aspect much has been done towards finding suitable kinds of dips and dressings. In Britain probably the main control method is dipping; the associated operations of jetting and spraying are only beginning to receive attention. Various proprietary dips which include arsenic, sulphur, nicotine and other substances and which are primarily used against sheep scab, have been tested for their repellent action to the flies, but none showed any marked effect, and a search for an efficient repellent amongst other chemicals is being undertaken by certain investigators. The apparent drawback of most dips is that, being water-soluble, they are leached from the wool by rain and lose their antiseptic properties as well as their volatile repellent substances in a very short time so that their period of protection is short. One realises that there is a limit to the duration of protection conferred by a chemical dressing and Kendrick and Moore (1937) have attempted to increase the period of time during which protection may be obtained by evolving a waterproof dip. This dip, which incorporates, *inter alia*, a water-white mineral oil, is stated to have given protection, when used under proper conditions, against the fly for four to five weeks. These authors mention, however, that when a flock is scouring it is impossible to control strike by any dressing since the relatively small amount of chemical substance deposited in the fleece is soon neutralised by a layer of faeces. In the north of Scotland the chief cause of scouring appears to be the presence of large amounts of wild white clover in the grazings.

While dealing with dips, Kendrick and Moore point out that one of the commonest causes of strike is dipping in a bath where the solution has become grossly contaminated by urine and faeces. They have noted cases where 1,500 to 2,000 sheep were dipped in a bath, to which fresh solution was periodically added to maintain the bulk, so that after the first two or three hundred animals had been immersed the remainder were submerged in what practically

amounted to a faeces emulsion and emerged with a slimy covering of faeces. They proceed: "It is a serious loss to clean out a large dipping bath after only 200 sheep or so have been through the dipper, and also to lose the drainage from the dipping pens, but at the same time it is false economy to go on dipping sheep in what is nothing more than a mud bath."

Attention has also been paid to the finding of a suitable and efficient dressing which will destroy the maggots on the sheep. A glycero-boric preparation evolved by Australian workers and which has shown excellent results has been found to be ineffective in Britain owing to climatic conditions. Maldwyn Davies and Hobson, however, point out that of the existing proprietary dips those containing arsenical compounds are the most efficient against newly hatched larvae as they act mainly as stomach poisons and not as repellents, but that there is evidence to show that they may damage the skin and cause a special type of wool condition. The ideal dressing should act as an antiseptic in healing the wound, should prevent reblowing by flies and should destroy the larvae quickly before they fall to the ground. In connection with this last desideratum Maldwyn Davies and Hobson emphasise the fact that it is a common practice among shepherds to rub out the maggots before applying any treatment, under the impression that these larvae will die of starvation away from the animal. This, however, does not occur because it has been shown experimentally that over 90 per cent. of such maggots rubbed out were able to develop into flies without any further food, provided they had had sufficient nourishment before being dislodged. These authors make it clear that shepherds and others should realise this and apply treatment before rubbing out the maggots or else make sure the maggots are killed.

Dressings usually employed in Britain to destroy larvae are carbolic solutions which, although lethal to the maggots, are harmful to the skin and do not prevent reblowing. A search for a more efficient larvicide which will have all the properties mentioned above is in progress.

It is of interest to note that the blowfly has at least one redeeming feature and that is the use of the larvae in the treatment of chronic bone infections, indolent wounds and ulcers. Since the Great War the saprophagous propensities of certain blowflies have been put to practical advantage in dealing with chronic osteomyelitis in man and the larvae, when reared under sterile conditions and introduced into wounds, were found to clear away suppurating tissues and inhibit bacterial growth better than other methods of treatment.

This annotation would be incomplete without reference to the part played by the late Dr. W. Maldwyn Davies, of Bangor, in the investigations and researches into the sheep blowfly problem. His sudden and tragic death in February of this year, at the age of 34 years, has resulted in a very serious loss to economic entomology. Davies had wide entomological interests and was concerned not only with pests of plants but also with those of domestic animals. For some years he had investigated strike in sheep and recently his collaboration with a biochemist had produced results of great value and held out promise of further successes. He was well fitted for his work because of his intimate knowledge of Welsh farmers and farming and he put this, combined with his scientific knowledge, to practical advantage. His quiet and unassuming manner endeared him to all who met and knew him and the writer recalls with satisfaction the many interesting and informative talks which he has had in past years with a man who will be sadly missed by his many friends and colleagues.

J. N. Oldham.

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During the past quarter of a century or more, an enormous number of historic pedigree cattle-breeding herds, in both Scotland and England, has dropped out of existence. In the past century this country has made history in the stock-breeding activities of the world, by a careful study of the science of stock production, and the development of breeding centres which, in due course, brought world-wide fame to these centres in particular, and this country in general. But how the list of such centres has decreased from time to time is a pathetic reflection for all interested in the production of the specific classes of stock involved.—*North British Agriculturist.*

ABSTRACTS

[**The Blowfly in Australia: Some Methods of Prevention.** Berrie, G. (1937.) *J. Min. Agric.* **44.** 1. 50-53.]

As a precaution against blowfly strike, two methods are recommended: crutching—performed before the fly begins its attack and twice with hoggetts and maiden ewes—and jetting. The latter consists of spraying with an arsenical preparation under considerable pressure. Properly performed, jetting gives an immunity in an ordinary season for several months and once the necessary plant is installed the cost is much less than that of crutching.

J. S. S.

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[**The Occurrence of** *Onchocerca gutturosa* **Neumann in Cattle in England.** Steward, J. S. (1937.) *Parasitology.* **29.** 2. 212.]

As a sequel to his previous successful investigation of the life history of *Onchocerca cervicalis*, Steward has made a study of the *Onchocerca* of British cattle and has again been successful in tracking down the intermediate host.

After making a study of the adult worms he concluded that the species which occurs in cattle in this country should be called *Onchocerca gutturosa* (Neumann, 1910) and that *O. bovis* (Piettre, 1912), the name which is more generally used, is probably a synonym applied two years after the publication of Neumann's description. Steward also considers it highly probable that a worm described by Stiles under the name *Filaria lienalis* also refers to the same species, although Stiles' description is too fragmentary to be certain on that point.

Adult worms were found by Steward, more or less closely coiled together in the gelatinous exudate lying between the two lamellar portions of the ligamentum nuchae, and also in the connective tissue between the spleen and the rumen, the infestation in the second site usually being the heavier. Certain constant differences were observed between worms recorded from these two sites which are not, however, regarded as of specific significance. Microfilariae were found in the skin of infected cows at a depth of about 1 mm. and were found to be almost identical with those of *O. cervicalis* from horses.

Trials were made with several species of flies as possible intermediate hosts, including *Stomoxys calcitrans*, *S. irritans*, four species of *Musca* and *Culicoides nebeculosus* (the vector of *O. cervicalis*) before species of *Simulium* were tried. Ultimately *S. ornatum* was found to give positive results, 42 per cent. of the experimental flies becoming infected. Some indication was obtained that *S. erythrocephalum* might also serve as an intermediate host but *S. salopiense* and *S. reptans* gave negative results. The development of larvae in the fly resembles that of *O. cervicalis* in *Culicoides*.

E. L. T.

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[**Earthworms as Transmitters of** *Capillaria annulata*, **the "Crop Worm" of Chickens.** Wehr, E. E. (1936.) *N. Amer. Vet.* **17.** 8. 18-20.]

Previous to the carrying out of the investigation which is reported in this paper the life history of all of the members of the genus *Capillaria* was thought to be direct and the possibility of an intermediate host being concerned had not received any consideration. On commencing work on the life history of *Capillaria annulata* Wehr first repeated the attempts, in which others had failed, to demonstrate a direct life history. On meeting with no better success in this direction he tried housing infected and uninfected birds together but met with no better result, there having been no transference of infection even after six and a half months of continuous close contact. He then began to explore the possibilities of the required intervention of an intermediate host and tried grasshoppers, dung beetles, pill bugs, sow bugs and, finally, earthworms.

The last-mentioned possible intermediate host proved to be the right one, two species of *Helodrilus*, *H. foetidus* and *H. caliginosus*, proving capable of transmitting infection.

A brief description is given of the larva which was recovered; this is about 200μ long, possesses a stylet similar to that of *Trichuris trichura*, and an enlarged, bifurcated tail end. [The figure which illustrates the description is inverted, presumably through a printer's error: the head end directed downwards instead of upwards, as is usual in reproducing figures of parasitic worms.]

E. L. T.

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[**A Cutaneous Affection of the Horse Analogous to the Necrotic Acne of Man.** Henry, A., and Bory, L. (1937.) *Rec. Méd. vét.* **113.** 2. 65-78.]

The authors describe a cutaneous affection of horses which occurs in certain regions of Normandy; it is a disease which has been known to veterinary practitioners for some years, an early description having been published in 1840. Lesions appear in the early summer along the upper part of the neck and shoulders and at the base of the tail. They become progressively worse during the hottest months but decline in the autumn, until the affection finally disappears, only to manifest itself again in the following summer. The same individuals are affected year after year, but the disease does not spread from one individual to another.

A study of the pathology of the lesions made in a biopsy of one case, late in the summer, led the authors to the conclusion that it is analogous to the necrotic acne which occurs in the human being. The general appearance and the intense pruritus, which is characteristic, suggest some form of scabies, but as the disease is, obviously, not contagious this possibility is ruled out and the cause remains unknown. There appears to be a definite hereditary predisposition and the authors advance the opinion that intense pruritus is brought about by a neurodermatitis and that the severe lesions are caused by the rubbing of the affected parts.

The local application of 2 per cent. flowers of sulphur in oil gave very good results in the treatment of early cases.

E. L. T.

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[**Entero-Toxaemic Jaundice of Sheep and Cattle. A Preliminary Report.** Rose, A. L., and Edgar, G. (1936.) *Austral. Vet. J.* **12.** 6. 212-220. 10 refs.]

The authors describe their successful investigation into the aetiology of a fatal disease of sheep and cattle the constant feature of which is a pronounced icterus.

In sheep, losses, which average 39 per cent. to 55 per cent., are confined to the British breeds and their crosses of all ages and show no seasonal incidence. Losses in cattle, almost exclusively amongst calves, reach 100 per cent.

Although the body fluids and organs of affected cases are sterile, an organism characteristic of *Cl. welchii* appears in large numbers in the contents of the ileum and caecum. A potent toxin can also be demonstrated in this material. Similar large numbers of coliform organisms appear in constant association with the welch-like organism.

Using *Cl. welchii* Types A and D antitoxins, complete neutralisation of the intestinal toxin and of the toxin prepared from the welch-like organism (V.F. broth and heart broth: 16 hours incubation) was effected. When small doses of whole culture (heart broth) were used neutralisation was positive only using *Cl. welchii* Type A antitoxin.

In the only field trial reported, complete protection was afforded three calves using *Cl. welchii* Type A antiserum. All nine control calves died.

The authors, on these grounds, feel justified in regarding the losses as due to a common disease; an entero-toxaemia due to *Cl. welchii* Type A.

W. T. R.

[**Discussion on Nutrition and its Effects on Infectious Disease.** *Proc. Roy. Soc. Med.* (1937.) **30.** 9. 1039-1052.]

Dr. S. J. Cowell reviewed recent contributions on this subject. The relationship of any particular food factor to resistance to infection in man is difficult to prove. A good diet may influence the course of an infection, but it may not prevent the occurrence of such an infection; alternatively malnutrition or any specific food deficiency may allow the establishment of infection by lowering the resistance of the individual.

Dr. Chick suggested that the effects of nutrition might be more easily studied in the chronic infective diseases. The resistance to infection may be lowered by the deficiency of any essential dietary factor.

Dr. L. Harris summarised recent work upon the diminution in excretion of vitamin C in the urine of patients affected with osteomyelitis and other diseases, the explanation advanced being that the infective process caused an increased destruction of vitamin C.

Dr. J. T. Edwards described a series of experiments with foot-and-mouth disease in small laboratory animals, The disease was most severe in adult, well-nourished animals, the susceptibility to infection being influenced more by the degree to which the diet promoted the metabolism in the animal body rather than to any specific constituent of the diet. Active metabolism was essential in order to establish the disease in the hedgehog. Similarly white rats show increased susceptibility to infection in response to good feeding.

Dr. H. Warren Crowe related how he had failed to produce arthritis in rabbits fed on a vitamin-deficient diet owing to the failure of the tissues to react to infection as the result of malnutrition.

E. C. H.

MILK BILL IN NOVEMBER

Underlying the proposals outlined in the Government's White Paper on Milk Policy, is the belief that quality will sell milk, and that, if more dairy herds are cleared of cows that react to the tuberculin test, the public will buy more milk and liquid sales will increase to such an extent that manufacturing milk will no longer present a serious problem and can be left to look after itself with practically no protection from low-priced imports.

"The Government's plan really asks farmers to stake all in gambling on a possibility in which they have little faith," says the *Farmers' Weekly* and adds: "The demand of the National Farmers' Union for the immediate withdrawal of the Government's milk policy has been submitted to the Ministry of Agriculture. But it is understood that the Government do not intend to depart substantially from the White Paper policy and their proposals are now being embodied in the Bill which will be completed within the next few weeks, and will come before Parliament in November."

REPORT

East Sussex County Council

REPORT OF THE CHIEF VETERINARY OFFICER, FOR 1936

This is the first report published by the County Veterinary Officer and it deals very extensively with the work done by the five whole-time Veterinary Officers. (The services of two part-time Inspectors were not required during the last year.)

PART I.—This deals with the Diseases of Animals Acts and Orders.

With regard to tuberculosis, it has been found by comparing the number of cases reported since the introduction of the Order in 1925 that these reached their lowest level in 1930-31 (about half the four previous years), their highest last year, when 495 animals were slaughtered. One factor given as accounting for this is that calves born in 1925-27 would be contaminated directly by "open" animals and would gradually become reportable cases. Now more cases are detected because of the increased inspections by the Veterinary Officers. Since 1925 there has been a steady decrease in emaciation cases and an increase in tuberculous udders reported and detected. Full particulars are given relating to compensation and salvage, and some facts about the *post-mortem* examinations, and it is suggested that "The vaccination of new-born calves and of tuberculin tested non-reacting cattle should achieve much in the solution of bovine tuberculosis in cattle and man."

In the section dealing with tuberculosis data the report points out that of the 492 animals found affected, 364, or 74 per cent., suffered from chronic cough.

There were nine positive cases of anthrax in the past year as against four in 1935. One case of parasitic mange occurred. For various contraventions of these orders, the Chief Constable took proceedings and convictions were obtained against 17 people, while nine were cautioned.

PART II.—This is concerned with herd examinations.

There are 384 Accredited herds in the county, involving the examination of 36,087 cows; from these, 102 cases of tuberculosis were detected. A list of other scheduled conditions found is given. The report adds that "The general condition of the cattle in the county must be considered quite satisfactory, very few animals not being in good bodily condition." The number of Tuberculin Tested herds was increased from 26 to 45 during the year and this includes five Attested herds. One hundred and fifty-eight markets and sales were inspected and 19 tuberculous animals found—an increase of ten on the previous year.

Investigations in 15 cases of suspected tuberculous milk were carried out under the Milk and Dairies (Consolidation) Act, 1915, and of 607 cows examined, nine cows were found to be tuberculous; six of these were giving tuberculosis in their milk. Under the Milk and Dairies Order of 1926 slaughtered calves and pigs found to be affected with tuberculosis were traced and cases of contaminated milk were investigated.

PART III.—This deals with various investigations into the diseases of sheep, pigs and poultry. Educational lectures have also been given and an experiment has been started, using the vaccine "Rakulin" for contagious abortion in cows.

The Chief Veterinary Officer is to be congratulated on the wide scope of the work and investigations which he has carried out, which, in addition to the routine inspections, should prove of immense value to stock-owners.

N.V.M.A. DIVISIONAL REPORTS

South-Eastern V.M.A.

SUMMER MEETING AT MAIDSTONE

DISCUSSION ON "DRY DISTEMPER" IN THE DOG: SO-CALLED "INFECTIOUS BROWN MOUTH" OF DOGS

The Summer Meeting of the South-Eastern Veterinary Association was held in the Royal Star Hotel, Maidstone, on June 24th, 1937. Mr. F. Crowhurst presided and the following fellows signed the attendance book: Messrs. E. P. Barrett, J. K. Bateman, W. P. Blount, J. G. Cattell, C. Crowhurst, F. A. Crowhurst, Major C. Davenport, Messrs. J. B. Dier, H. Scott Dunn, F. C. Gillard, H. P. Hogben, F. Marks, Major G. E. Oxspring, Messrs. C. W. Perrin, L. P. Pugh, C. Roberts, F. B. O. Taylor, S. B. Vine and T. Dalling (Hon. Secretary). The following visitors were present: Dr. R. F. Montgomerie, Dr. L. Jordan and Mr. J. S. Steward.

Apologies for absence were received from Sir Frederick Hobday, Professor J. B. Buxton, Dr. A. McEwen and Messrs. Spicer, Whicher, Hodgman, Isherwood, Gooch, H. Taylor and A. Thomson.

The minutes of the previous meeting, published in the *Veterinary Record* of June 19th, were taken as read.

Obituary.—The Hon. Secretary intimated that since the last meeting a very old Fellow of the Division, *viz.*, Major L. Lyne Dixson, had died. As mark of respect and sympathy, the President called on the meeting to be upstanding in silence.

Resignations.—Two intimations of resignation were announced, from Major J. M. Richardson, St. Leonards-on-Sea, and Mr. R. S. Roberts. Both found it impossible to attend because of long distances and it was decided to accept the resignations with regret.

Nominations.—Nominations for fellowship were obtained from Dr. R. F. Montgomerie (Beckenham)—nominated by Professor T. Dalling and seconded by the President; and Mr. J. S. Steward (Maidstone)—nominated by Professor T. Dalling and seconded by the President.

Correspondence.—The Hon. Secretary read a letter from the N.V.M.A. in connection with the publication of papers presented at Divisional meetings in which it was pointed out that the Editorial Committee was not committed to give publication to such papers but would be prepared to consider each paper individually.

R.S.P.C.A.—The Hon. Secretary reported that in connection with the R.S.P.C.A. activities at Folkestone, the committee appointed by the South-Eastern Division had met and had investigated the matter, receiving evidence from the veterinary surgeons concerned. A report was drawn up and sent to the N.V.M.A. which had set up a small committee to consider the subject further.

"Dry Distemper" in the Dog

The President now called on Major L. P. Pugh to continue his paper on "'Dry Distemper' in the Dog: So-called 'Infectious Brown Mouth' of Dogs," published in the *Veterinary Record*, June 19th, before declaring the subject open for discussion. Reprints of the paper had already been circulated. Major Pugh summarised the paper he gave at the last meeting and the paper was then discussed as follows.

. . . . . .

Major Dalling (Beckenham) opened the discussion in the following terms.

The position with regard to the investigations we have carried out in collaboration with Major Pugh is as follows. A few years ago, before Major Pugh brought forward the subject, we had to deal with an outbreak of an infectious condition in a kennel of greyhounds which had been "immunised" against canine distemper. Several carcases were received and I visited the kennels to procure further specimens for examination. They included samples of blood obtained when the affected dogs were showing high temperatures and pieces of tissues taken from dogs recently dead. The results of our examinations were that we failed to detect the presence of distemper virus in any of the tissues nor could we find any evidence of its presence. In examining tissues for the presence or for evidence of distemper virus we make use of two distinct tests—the injection of ferrets and the complement-fixation test. On some occasions we inject dogs susceptible to distemper virus with the materials being tested. We know as the result of many experiments that if a dog is infected with distemper virus one or other or all of these tests will prove the presence of the virus. Thus, the ferret will become infected with typical canine distemper; the spleen will, in the presence of immune dog serum, cause fixation of complement often to a marked degree; susceptible dogs will develop high temperatures and other symptoms of infection with distemper virus and the virus will be recovered by injecting its blood at the height of the fever into ferrets. It follows, therefore, that if none of these tests gives a positive result we are practically certain that distemper virus was not present in the tissues being tested and that, in all probability, the dog from which the tissues were taken was not suffering from true virus infection. Sometimes it is difficult to obtain satisfactory material for examination but in the case of outbreaks of disease in kennels where a number of dogs are affected and are in various stages of the infection, there is not much difficulty in collecting suitable tissues. If the infection has been running for some little time and complicating diseases are present, the difficulty is increased and the results of the tests are not so accurate. With this group of greyhounds suitable material was available. We failed to show the presence of distemper virus in any tissue when tested by the ferret or complement-fixation tests but puppies susceptible to distemper, when injected with spleen emulsions or blood, developed high temperatures and showed vague symptoms of virus infection. Their blood, however, failed to infect ferrets.

We were able to run a further experiment in which we injected puppies which were immune to distemper virus and were surprised to find the same symptoms, *viz.*, rise in temperature and vague symptoms as found in puppies suffering from distemper virus infection. Unfortunately we were unable to continue investigations at that time. Then Major Pugh came along and explained the types of cases which were occurring in his practice. I visited an infected kennel with him and obtained some satisfactory material for testing purposes. The results of our examinations were exactly similar to those obtained with the greyhound tissues and in addition we were able to transmit the infection from dog to dog. Again the infective agent was lost and our work had to cease. Major Pugh was able to arrange that ferrets we provided were exposed in some infected kennels. We provided ferrets susceptible and immune to canine distemper virus and in no case did we find that the ferrets on return to us became ill;

furthermore, the susceptible ferrets were still susceptible to distemper virus when tested some weeks after exposure. In one kennel there was undoubted distemper present but in others we failed entirely to prove its presence.

The latest example of this type of infection on which we worked occurred in a kennel of staghounds during the late spring of this year. All the animals had been "immunised" and an alleged breakdown had occurred. I visited the kennels on two occasions and obtained satisfactory material for examination. We examined by the ferret and complement-fixation tests for the presence of distemper virus but failed to demonstrate its presence in any of the tissues. At the same time we experimented with dogs. Blood and spleen from the staghounds injected into puppies both susceptible and immune to canine distemper virus caused feverish reactions from which the animals recovered. Clinically, it was impossible to differentiate between the disease set up in these puppies from that caused by the injection of distemper virus. Blood from these puppies taken at the height of the fever when injected into another set of puppies produced the same type of infection. Puppies susceptible to distemper virus, when they again became normal after being injected with the staghound tissues, were proved to be still susceptible to distemper virus.

It would, therefore, appear that there does exist in dogs a disease which is not caused by the Laidlaw-Dunkin distemper virus which in the laboratory gives rise to a clinical picture practically similar to that produced by the distemper virus and which does not infect ferrets. It seems highly probable that the cause is also a virus because we failed to isolate any bacteria of pathogenic importance.

I would point out here that all I have been talking about in the clinical aspect of the infections is what we find in the laboratory in dogs which are carefully isolated all the time and in which secondary infections rarely occur. I am convinced that what we call "distemper" in practice is not the train of symptoms associated with distemper virus infection but is the result of the action of other organisms which gain access to the various systems of the dog consequent upon the primary effect of the virus. If this infection which we are discussing is also caused by a virus, then there is no reason why the symptoms seen in practice should not correspond exactly to those described in "distemper" cases.

I have for a long time suspected the existence of a virus in dogs other than that referred to as the canine distemper virus. The results of the investigations to which I have referred seem to me to have enabled us to be more certain than we were that such a virus does exist.

Major Pugh referred to the presence of distemper virus in the brains of dogs. We have recovered true distemper virus from this tissue on several occasions but it cannot be done with regularity even in dogs showing clinical evidence of involvement of the nervous system. The histologist, however, can assist in the diagnosis of distemper involving the nervous system from the microscopic appearance of brain sections and can differentiate between distemper virus infection and other conditions in which the symptoms are similar. We must not forget that Pugh, working with Perdrau, described a condition affecting dogs in which the histological picture was that of an encephalomyelitis, a condition which is probably more common than is generally believed and is probably not associated at all with canine distemper virus.

Mr. J. K. Bateman (Northaw, Herts.) who also opened the discussion, said:—

I should like to take this opportunity of thanking Major Pugh for bringing this subject up and also to compliment the South-Eastern for giving us all the opportunity to air our views on it.

To be candid, I have an uncomfortable feeling that the author has travelled a bit fast. I agree with him whole-heartedly that there is another disease of dogs which attacks those immunised against, as well as those susceptible to, distemper. But I dislike intensely the words "believed to be immune," and I have a suspicion that some of his cases were never immune at all, and that they had fallen victims to true virus distemper even if he failed to put down exposed ferrets. We read that "ferrets remained healthy after exposure," and since I can only judge the written word I am bound to enquire what was the subsequent history of those ferrets. Were they immune at the outset, or were they subsequently injected with live virus and succumbed to it? Let us be candid. The mere injection of vaccine virus or virus serum need not necessarily cause immunity. What were the temperature reactions following the injection of the virus? In my opinion that is highly important, because I, personally, am never satisfied unless I see a temperature reaction. I refer particularly to the virus-serum method (which I favour). I can *say* that dogs have remained immune after that method and without showing temperature reactions, but I have lacked the previous history of the dogs, and it may well be that they have been immune before I started. I *do* know that dogs which have reacted to 104° or more always remained immune.

For some years I have been in the favourable position of knowing absolutely without question that quite a large number of greyhounds under my immediate control were *known* to be immune, and passed through successive epidemics of distemper without reacting in any way. Some have been immunised artificially and some were immune by reason of natural infection. Some of them have become victims

of another disease comparable to that described by Major Pugh, but out of some hundreds I have always found that the diphasic temperature chart is the exception—certainly I believe not more than 1 or 2 per cent.

As Major Pugh says, the tendency to nasal discharge is slight. A sticky, greenish, brown-coloured piece of discharge can be seen at the nostrils but it has become my belief that the secondary rise and sometimes death can be brought about in the subacute type by mishandling of the patient. Constipation and vomition or inappetence are the rule at the outset, and here I may say that in my experience of the greyhound under careful feeding conditions it is almost unknown to find distemper ushered in by vomition. In this other disease, pharyngitis, a mottled appearance of the buccal mucous membrane, or tonsillitis are all likely to be encountered. Rheumatic pains in the neck and loins are common. The temper is bad and the dog cannot jump on his bed. The urine is albuminous, dark coloured, and smells strongly. To-day, I can only deal with this type, but I see in Major Pugh's paper what I believe to be the real cause of the second rise in temperature. I am satisfied that the feeding of meat is the surest way to complicate or even terminate your case. I rigidly withhold all proteins, give large quantities of saline, barley water, etc., to drink, and, if necessary, glucose saline subcutaneously. I find that recovery is the rule. Colonic lavage is a necessity. Never fear loss of condition if the dog will continue to drink and never pour anything into his mouth unless it is liquid paraffin in the early stages. Calcium Sandoz, mixed Welch serum, anti-distemper serum in the distemper-susceptible, all fail to alter the course of the disease which, in the majority of cases, clears up within a fortnight—sometimes within a week.

I do not wish to take up more than my share of your time—there is much more can be said about this disease, but I shall add these remarks. Major Pugh commenced by quoting what Henry Gray said in 1913: let me quote what the same gentleman said in 1916 about distemper—ten years before the *Field* investigations.

> Extracts from E. Wallis Hoare: "Veterinary Therapeutics"
>
> *Of Canine Distemper.*—It is due to a filtrable virus. This filtrable virus is mostly associated with or accompanied by superadded or secondary infections which are set up by various microbes inhabiting the animal system or its surroundings. The chief microbes involved in these secondary infections, which account for the majority of localisations or complications, are micrococci, staphylococci, the *Pasteurella canis*, the *Bacillus coli communis*, etc.
>
> *Of Canine Typhus.*—There are a great number of mild or atypical cases not always recognised as belonging to this disease, that recover, and which should be taken into account when preparing statistics. . . . Mild Form.—In this form the following symptoms are observed: The dog may be somewhat dull; he has shivering fits and little or no appetite, and perhaps an increased thirst. After a time he vomits everything he takes, and also any food or medicine which is forced on him. In a few days a slight gangrenous ulceration of the buccal mucous membrane appears, especially over those parts which come in contact with the canine, carnassial, and perhaps the upper and lower incisor teeth. Frequently, however, this latter change is absent. In some cases the only symptoms present are an increased thirst, and perhaps frequent passage of urine. In most instances there is at first a slight diarrhoea. Under rational treatment recovery takes place in two or three days.

These observations are a tribute to the careful clinical study of Henry Gray, and I most heartily agree with what he has to say. It is my opinion that Major Pugh is dealing with the different types of that disease known as "canine typhus" or Stuttgart. There seems to me to be no justification for calling it brown mouth or "dry distemper"—certainly not until we have made a very profound study of all the conditions. I see no reasons for labelling it "brown mouth," because I feel that a brownish covering will develop if the necessary secondary invaders are present in your case whether it be distemper or ulcerated mouth. Similarly I fail to see why a dog, since it has tonsils, cannot have tonsillitis along with distemper without our being called upon to look on the case as suffering from two specific virus diseases. I have recovered the distemper virus under these conditions.

I prefer to keep the term "dry distemper" for that type of true *virus* distemper in which (1) the virus attacks the C.N.S. with consequent prolonged elevated temperatures and subsequent paralysis, fits, etc. It may be that the nasal discharge may not take place at all, or that the above syndrome occurs after all traces of discharge have ceased. The picture will vary very little and dilatation of the pupil will be the general precursor; or (2) in which consolidation of the lungs takes place, and discharge is again non-existent. Again let me plead that before we give this disease a new name, we should explore those conditions as described by Gray and others, under the name of "canine typhus," and do not let us expect gangrene of the tongue as being necessarily the only type of Stuttgart disease. And now my final criticism. On page 391 of the current volume of the

Veterinary Journal is a diphasic chart of a hound pup of three months. The caption is "Hound Pup, three months. Diagnosed as distemper. No response to serum. Re-diagnosed Brown Mouth." That means absolutely nothing to me. How much serum must a three months hound pup get before we can be sure it proves the case to be distemper? Is that the way to prove your disease? I claim that I am just as likely to be right if I say it *was* distemper, and though I am honestly appreciative of the enthusiastic work Major Pugh has put into his paper, yet if this is the type of structure on which it is built, it is sure to topple.

Mr. Hodgman has told us of the immense benefit immune serum has been to greyhound companies. My personal opinion is that serum, in doses of less than 40 c.c., is not likely to benefit the case of distemper in a greyhound at all, whether it be given at the outset or even in 10 c.c. doses at intervals. Some day I hope to publish my charts on this subject, but I have had the misfortune to lose greyhounds after giving 30 c.c. of the serum at the outset of the disease, pneumonia being the cause of death. Serum is invaluable in prophylaxis and its judicious use can save owners of large kennels an immense amount of money and worry, not to mention the lives of valuable dogs. Two of this country's most exclusive greyhounds in recent years, "Davesland" and "Ataxy," were both actively immunised by reacting to natural infection controlled by hyperimmune serum.

Captain Gillard (Folkestone) observed that it seemed to him that practically every symptom that could be associated with dogs when they were ill had been enumerated under that new disease. He was rather struck and rather consoled when Major Dalling said that all he had found in those cases was a febrile reaction. He did not say that any of the symptoms were fatal, but according to Major Pugh there was a considerable mortality. He thoroughly endorsed Mr. Bateman's remarks, as far as his experience went. Mr. Bateman's opinions were very clear cut: he had no doubt in his mind as to what he had been treating; he had had distemper to deal with in the large percentage of cases and the others were what he (Captain Gillard) preferred to call Stuttgart disease.

He did not agree with the use of that term "dry distemper": the public would be confused if such a name were employed.

He would like to ask Major Dalling if those cases he inoculated showed any further symptoms and if there was any mortality.

They must of course remember that Mr. Bateman's dogs were living under very guarded conditions whereas in practice dogs were allowed to run the streets or to get thoroughly wet or their diet was not carefully attended to. Therefore, they got more of the abstract type of case.

He was very surprised to hear that no vomition was noticed; he had so often had vomition in cases which had turned out to be distemper.

Mr. H. Scott Dunn (Hove) said that, personally, he would not attempt to try to differentiate between the two diseases; indeed, he did not believe there were two diseases—he still thought they were dealing with distemper. He should have great difficulty in trying to persuade his clients that he was dealing with a new disease: the average dog-owner knew distemper. If he were to depend on a temperature in diagnosis of distemper he would often be wrong.

No time should be wasted on dogs showing nervous symptoms; they should immediately be put to sleep.

Regarding Stuttgart disease, in his opinion it did not exist except in an acute form.

Mr. E. P. Barrett (Margate) stated that he found himself in a similar position to the other speakers.

It was interesting to hear from Major Dalling that he had found outbreaks amongst which dogs had died but where he had been unable to find the virus of Laidlaw and Dunkin. He should be very interested to know whether every dog in the infected kennels developed the disease and whether it spread by direct contagion from dog to dog. Some years ago he had to deal with an outbreak of a similar nature in greyhounds. The symptoms were the running of a temperature of 103 to 107°, dysentery, vomiting in the early stages, haemorrhage from the gums with brown deposit, acute wasting. There were twelve cases at the beginning of the outbreak and all died, some after showing symptoms indicative of violent pain. Death was extremely rapid—often within 36 hours. During that season there were 22 cases but only one died after the introduction of the formalin intravenous treatment recommended by Dr. McCunn.

One of the peculiar features of this condition was that it rarely affected all dogs in the same kennels.

Regarding the new virus, he was asked to immunise a litter of Alsatians against distemper. Six months later he was called in to see one with a disease nothing like "infectious brown mouth": the symptoms were exactly like those in virus distemper. The dog was destroyed and material was sent to Major Dalling who found it produced illness in both immune as well as susceptible puppies.

Concerning immunised dogs, in such one occasionally met with illness from infection with either streptococcus or bronchisepticus. He found that they responded quite well to either streptococcus or bronchisepticus serum.

Mr. C. Roberts (Tunbridge Wells) said that with regard to the coating of the teeth, his father talked to him about that many years ago: he (the speaker) thought that it was just altered blood from the gums which had been bleeding.

He should like to ask Major Dalling if one could expect dogs to be permanently immune after the Laidlaw-Dunkin treatment, or even after a natural infection with distemper. After all, human beings were supposed to be immune after an attack of measles, but one did find people who had had it once, twice or even three times. During the last month he had had experience of dogs which had been immunised suffering from distemper.

The Replies

Major Pugh, in reply, said that some of the criticisms made him feel as if he had stuck a stick into a hole and found a wasp's nest. In spite of the criticisms, however, he was sticking to his guns. He was perfectly convinced that what they met in the field at times and had hitherto diagnosed as "distemper" was really another disease. He was not trying to describe a new disease; what he was trying to get at was that what they had described as distemper

was not always virus distemper, but that two diseases had been occurring simultaneously—each being called distemper.

He agreed with Mr. Barrett that the Laidlaw-Dunkin method II did protect against distemper and conferred immunity. This need not necessarily blind them from being on the watch for the occurrence of other diseases. When one got 100 per cent. failure in distemper immunisation, then he did think it was time to begin to investigate, and when Major Dalling said he had examined material from dogs and found a febrile condition in dogs which were not immune and dogs which were immune and failed to infect ferrets, he maintained that that was very strong evidence that such an outbreak was not distemper of the Laidlaw-Dunkin type. He thought that probably 85 per cent. of cases were true virus distemper, but he was certain this other disease was occurring. The term "dry distemper" was used by lay people in cases where there was no discharge, etc.

With regard to coating of the teeth, in agreed with Mr. Bateman that that was due to secondary invaders.

He could not agree that cases in which the nervous system was involved would recover more or less spontaneously under saline treatment.

He had been particularly interested in nephritis and in the cases where hysteria occurred at the beginning. In spite of any treatment, the dog usually would die.

Regarding the question of temperatures, the first thing he did was to take temperatures and if there was a rise the dog was put into isolation. He regarded temperature taking as essential in the diagnosis of distemper.

Major Dalling, who also replied, said that the diseases referred to as "brown mouth" and "virus distemper" had exactly similar symptoms in affected dogs in the laboratory. The symptoms differed, however, very much from those found in kennels, etc., in which groups of dogs were affected. Both diseases were, in his opinion, in the majority of cases definitely mild in the beginning but when secondary infections occurred, as in dogs in kennels, all types of symptoms might develop. In the laboratory it was seldom that secondary infections occurred and usually the infected dog recovered without having been markedly sick. He was sorry he forgot to mention the case which Mr. Barrett sent him some years ago. It came soon after the greyhound investigation was carried out and he thought now was probably a case of the infection they were discussing that day.

Those diseases, when studied under controlled conditions in dogs in strict isolation, presented a picture vastly different from that seen in the field. It was only in a laboratory that the uncomplicated disease could be studied.

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Presentation to Professor Dalling

The President kindly entertained the Fellows and visitors to tea, after which a presentation was made to the retiring Hon. Secretary (Professor T. Dalling).

Major Pugh called on the President to make the presentation and referred to the work the Hon. Secretary had done for the Association and for many of them individually.

The President referred to the working of the Association during the seven years when Professor Dalling was Hon. Secretary and voiced the view that the Association was now on very firm ground. In requesting the Hon. Secretary to accept the presentation, the President asked Professor Dalling also to accept his best wishes and those of the Fellows for his success and happiness in his new life at Cambridge.

Professor Dalling replied in suitable terms and expressed the hope that he would be allowed to attend the meetings from time to time.

The presentation consisted of bookcases, a desk chair and a silver salver suitably inscribed.

T. Dalling, *Hon. Secretary.*

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West of Scotland V.M.A.*

Annual Meeting at Glasgow

The Annual Meeting of the Division was held at Glasgow Veterinary College, on April 28th, 1937, when, in the absence of the President (Mr. W. Watt), Prof. Robb occupied the chair.

The following members were present: Profs. G. W. Weir and J. W. Emslie, Messrs. D. Brown, A. C. Ford, M. H. W. Miller, C. Tracy, W. Harley, N. Nicolson, S. Jamieson, A. Sillars, H. H. Brodie, J. F. Taylor, D. Campbell, W. L. Weipers, Miss H. J. Mitchell, and A. Thomson (Hon. Secretary). Mr. E. L. Taylor (Ministry of Agriculture), Messrs. H. M. Roemmelle, J. McArthur, J. G. McGreevy, W. Gowans, R. N. Aitken, and senior students of the College, were present as visitors.

Mr. E. L. Taylor gave a most interesting demonstration and lecture on Helminthiasis in Farm Animals, which was followed with close attention. Prof. Robb thanked Mr. Taylor on behalf of the members. [Mr. Taylor's paper is reproduced at the commencement of this issue. —Editor.]

Before commencing the Business Meeting the members stood in silence in tribute to the late Mr. W. M. Ferguson.

Apologies for absence were received from Dr. A. W. Whitehouse, Messrs. W. Watt, J. G. McGregor, A. M. K. McLeod.

Arising out of the Correspondence, the Secretary was instructed as to the replies.

Post-mortem Findings in Tuberculin-Tested Cattle

A report of the results of the *post-mortem* findings on the cattle tested by Mr. Abbott at the last meeting was handed to the Secretary,

*Received for publication August 19th, 1937.

Cow.	First Reading.	Second Reading.	Final Reading.	Result of Test.	*Post-mortem* Findings.
	m.m.	m.m.	m.m.		
R. & W. No. 207					
Tail	4	6·5	10	Positive	A few small tubercles in the mediastinal glands.
Rt. side Neck	6	9	15		
R. & W. No. 212					
Tail	4	5	9	Positive	[No *post-mortem* examination was made on this animal.]
Lt. side Neck	6	10·5	20		
B. & W. No. 1					
Tail	5	11	18	Positive	Small tubercles in each of the mediastinal and bronchial glands.
Lt. side Neck	5	10	16·5		
R. & W. No. 248					
Tail	4	5·5	—	—	Animal slaughtered before completion of test.
Neck	4·5	6	—		
R. (white belly)					
Tail	3	19	21	Positive	Large tubercle lesions in both bronchial glands and in the mediastinal glands.
Neck	5·5	16	22		
R. & W. (in byre)					
Tail	3	6	12	Positive	Small tubercles in the bronchial and mediastinal glands.
Neck	5·5	11	20		
R. & W. No. 233					
Tail	3	9	14	Positive	Several large lesions in the mesenteric glands. Head, retropharyngeal glands tuberculous. Bronchial, mediastinal and prescapular glands tuberculous.
Lt. side Neck	5	16	30		
R. & W. No. 217					
Tail	3·5	5·5	8	Positive	Two barley-grain-sized tubercles in the left bronchial gland and a pea-sized lesion in the right bronchial.
Rt. side Neck	6	9	13		
R. & W. No. 205					
Tail	3	5·5	6	Negative	No lesions found.
Lt. side Neck	5	8	9		
W. & R. No. 213					
Tail	2·5	5	13	Positive	Small tubercles about the size of barley grain in the mediastinal glands.
Rt. side Neck	5	9·5	18·5		
W. & R. No. 221					
Tail	3	7	22	Positive	Small tubercle in the left bronchial gland.
Lt. side Neck	5·5	11·5	27		
R. (white face) No. 222					
Tail	2·5	5	12	Positive	Lesions in the bronchial and mediastinal glands.
Lt. side Neck	6	11	24		

and it was agreed to forward them to the *Record*. These results were as recorded above.

Membership.—Mr. J. G. McGreevy was nominated for membership, and Mr. A. C. Ford was unanimously elected as a member.

Discussion.—The postponed discussion on Mr. Sillars' paper, "Recent Legislation on Milk Production and its Influence on Veterinary Practice," followed and many points of interest were raised.

The meeting concluded with votes of thanks to the essayists and to Professor Robb for his conduct in the chair.

Alex. Thomson, *Hon. Secretary.*

The Poultry Technical Committee have concluded a week's tour of the southern and central areas of Scotland, during which some 50 to 60 poultry farms have been visited and the mortality position closely investigated.

* * * * *

The skipper of an Esthonian vessel which visited the Tyne was fined 20s. at Gateshead for bringing a sheep into the port of Newcastle from a prohibited country. The ship had come from Portugal, and the master explained that it was a pet. The animal was perfectly clean and its wool in good condition. An inspector of the Ministry of Agriculture and Fisheries pointed out that the bringing of sheep from Portugal and other countries into England is prohibited under the Importation of Animals Act, 1930.

Lincolnshire and District V.M.A.*

MEETING AT THE REMOUNT DEPOT, MELTON MOWBRAY

By kind permission of the Director of Remounts, the meeting of the above Society was held at the Remount Depot, Melton Mowbray, on June 23rd, 1937. The business side of the meeting was postponed as the afternoon was completely taken up with demonstrations, etc.

The following attended: Major C. W. Townsend (President), Messrs. F. L. Gooch and G. B. Brook (Honorary Associates), and Messrs. J. H. Poles, G. Eaton, R. Swaby, G. Lockwood, G. Gibson, A. Williams, R. D. Callaghan, F. W. L. Gooch, A. N. Foster, A. Logan, H. Walpole, J. Macdonald, F. H. Sugden, T. J. Keall and W. Gibson (Hon. Secretary). Major C. H. S. Townsend, Major J. J. Plunkett, Messrs. J. N. Glass, R. J. Powell, J. Bishop Young, J. Fraser and Townsend, Junr., were present as visitors.

Demonstrations

Major C. H. S. Townsend first demonstrated the roaring operation on a heavy-weight hunter in the recumbent position under a local anaesthetic. There are few remarks to be made about this demonstration, as all veterinary surgeons are familiar with the operation, the mucous membrane lining the ventricle being removed by the aid of a burr. The necessity for the employment of an assistant to hold the retractor in position was dispensed with by the following means. A rubber band, with metal hooks at each end, was passed round the horse's neck, the hooks fixing in the handles of the retractor securely holding the latter in position during the operation. After its completion the hooks were joined together, holding a sterilised towel in place over the operation wound until the horse had risen.

Another useful point demonstrated was the method of fixing the patient on his back. Before casting in the usual way with hobbles, a soft cotton rope loop was passed round each fore-arm and the ropes passed over the horse's back to the other side. When the horse was cast the loops were passed down over the feet, becoming fixed round the fulcrum of the hobbles with the end of the ropes over the back to be secured to the loop on the opposite side of the horse; between the rope and the horse's sides (when on his back) were placed two large, square, tightly-stuffed bolsters, so that when the ropes were tightened the horse was securely fixed on his back, with knees and hocks flexed, between the two bolsters. The operation, casting and fixing the horse were very expeditiously carried out; the whole demonstration taking under 15 minutes.

Major Townsend then proceeded to show us the operation in the standing position, of which the following is a brief description.

(1) Shave and sterilise the operation area.

(2) Anaesthetise thoroughly with 10 c.c. 3 per cent. Novutox.

(3) Allow five minutes for the anaesthetic to function; have the head raised by a man's hand under the jaw. It is not necessary to lift the head very high and quite unnecessary to tie it up to a beam. Incise through skin, muscles and crico-thyroidean ligament.

(4) Insert retractor.

(5) Anaesthetise the lateral ventricles by holding a swab of gauze on the end of forceps soaked in 10 per cent. Novutox in each for 30 seconds.

(6) Permit the head to come to the natural position for three minutes to allow the anaesthetic to work.

(7) Lift the head and, in the case of a restive horse, put on a twitch: as a rule this is not necessary.

(8) Invert the lining of the ventricle with a burr.

(9) Catch up the lining with forceps and invert completely.

(10) Cut off the lining with a scalpel.

(11) Repeat with the other ventricle.

(12) It is necessary for the operator to wear a good electric light on his forehead; except for this, no instruments other than those used for the operation in the recumbent position are required.

The horse in question was a heavy-weight hunter and hardly moved during the whole course of the operation, which took about 15 minutes.

The operator stated that he had now performed the operation in this way on over 40 cases with no difficulty; he claimed no advantage for the standing method, however, other than the elimination of risks due to casting. Major Townsend added that the after-treatment consisted of keeping the wound clean by merely cleansing twice daily with sterilised gauze: the wound was usually completely healed in ten to 12 days.

Some operators had the horse tied up for some days after operation, but he preferred to turn it immediately into a loose box and feed in the usual way. It might be turned out to grass in about three weeks, or quietly ridden about, but he did not advise any strenuous or fast work for six weeks or, better, two months.

Major J. J. Plunkett next showed us six horses, some of which had and some of which had not been operated on for wind, and we were all invited to express an opinion as to which had been subjected to operation, by first

*Received for publication August 22nd, 1937.

manually examining the animal for scars, etc.; then the horses were grunted and finally lunged. Many varying opinions were expressed about the presence or absence of a scar; in fact, it was unanimously decided that it was impossible to tell anything by palpation, etc. In one case only was there anything definite to feel and that horse had been recently operated on. All the horses that had been operated on "grunted" at the stick, but were in nearly every case very clear in their wind when lunged.

Major Plunkett also staged a demonstration that finally developed into a competition. He showed six horses whose ages were definitely known to himself (having been purchased when three- or four-year-olds). The ages of the horses varied from six to ten years. Members were given cards and invited to estimate the age of each horse. The cards having been collected and checked by Major Plunkett, it was found that no one had all the ages correct, the competition being won by Mr. F. W. L. Gooch with five out of six. This demonstration was a very useful one as it showed that the method of ageing horses by the teeth is by no means so reliable as it is commonly accepted to be. The result was a great surprise to all present.

The meeting concluded with tea at the King's Head, Melton Mowbray, at the invitation of the President, several ladies being present.

A vote of thanks was proposed by Mr. F. L. Gooch to the President for his hospitality; this was seconded by Mr. J. H. Poles and passed unanimously.

Votes of thanks were also passed to the demonstrators, the Director of Remounts and the Staff at the Remount Depot.

Wm. Gibson, *Hon. Secretary.*

LONDON'S STRAY CAT PROBLEM: LICENCES PROPOSED

Our Dumb Friends' League has decided to launch an educational campaign with a view to reducing the number of homeless cats, especially in the London district.

The Chairman of the Animals' Shelter Committee of the League stated recently that it was becoming increasingly difficult to deal with the number of stray cats in London. From one hotel in West London the League had just collected 39 strays at the request of the management. Many such cats were diseased through neglect, and were a menace to health. Often cats sought shelter in motor cars near their homes, were driven off to a strange district, and then became scavengers in order to exist.

The League would distribute to cat owners elastic collars and discs on which names and addresses could be engraved so that it could be seen at a glance that the animal had a home.

Parliament would also be urged to introduce a licensing system for cats. While it was not desired that the fee should be high it should be enough to make cat owners value their pets. At present many householders allowed their cats to wander away, and colonies of strays were to be found in some parts of London living practically wild.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Oct. 4th.—N.V.M.A. Committee Meetings.
Oct. 5th.—**N.V.M.A. Council** and Committee Meetings.
Oct. 6th.—R.C.V.S. Committee Meetings.
Oct. 6th.—Victoria Veterinary Benevolent Fund Council Meeting.
Oct. 7th.—R.C.V.S. Committee Meetings.
Oct. 7th.—Central Division, N.V.M.A., meetings at the Conway Hall, Red Lion Square, W.C.1. Special General Meeting, 6.30 p.m.; Annual General Meeting to follow.
Oct. 8th.—**R.C.V.S. Council** and Committee Meetings.
Oct. 8th.—Eastern Counties Division, N.V.M.A., Meeting at Ipswich, 2.15 p.m.
Oct. 13th.—Meeting of the Derbyshire Division, N.V.M.A., at Sutton Bonington, Loughborough, 2.30 p.m.
Oct. 14th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Lincoln, 2 p.m.
Oct. 15th.—Meeting of the Mid-West Division, N.V.M.A., at Bath, 2.30 p.m.
Oct. 15th.—Meeting of the Sussex Division, N.V.M.A., at Brighton, 2.45 p.m.
Oct. 29th.—Yorkshire Division, N.V.M.A., Annual General Meeting at the Hotel Metropole, Leeds, 3 p.m.
Nov. 9th.—**Royal Veterinary College: Opening of new buildings at Camden Town by His Majesty King George VI.**

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PERSONAL

Major J. H. Taylor to be Darlington's Next Mayor

The many friends in the profession of Major James Harry Taylor, M.C., F.R.C.V.S., and Mrs. Taylor, of "Thornton," Abbey Road, Darlington, will be gratified to learn that they are shortly to occupy the honoured posts of Mayor and Mayoress of that important Durham township. Among the many veterinary surgeons rendering yeoman service as members of local authorities, none has done more than Major Taylor to merit the high distinction conferred upon him by his fellow townsmen. Representing the South Ward on the Town Council since 1930, he has devoted to its work a steadily increasing amount of the time available to him since his retirement from practice somewhat earlier, believing that it was helpful to the profession for one of its members, so placed, to give his attention to the local government of the area in which he lived.

Major Taylor was born in Oldham, where his father was a veterinary surgeon, and educated at Manchester Grammar School. On leaving school he was apprenticed to Messrs. J. and A. Lawson, veterinary surgeons, of Manchester. After his two years' apprenticeship he went to the Royal Veterinary College, London, and secured his diploma of membership of the Royal

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College of Veterinary Surgeons in 1891, and the Fellowship diploma in 1900. He moved to Darlington in 1895, and with the late Mr. W. N. Dobbing, succeeded to the late Mr. F. R. Stevens's practice in Skinnergate.

In 1915 he went to France with a lieutenant's commission as veterinary officer with the 21st Heavy Brigade, Royal Garrison Artillery, later being promoted captain and appointed officer commanding the mobile veterinary section of the Fourth Division. After 18 months he was appointed Deputy Assistant Director of Veterinary Services of the Fourth Division, holding the rank of major. He was awarded the Military Cross. After the War he went to Germany with the army of occupation, being Deputy Assistant Director of Veterinary Services of the Lowland Division, and later to Upper Silesia, remaining there until 1921, when he was demobilised.

For a number of years Major Taylor was Hon. Secretary of the old South Durham and North Yorkshire Veterinary Association, and when this body amalgamated with the North of England V.M.A., in 1921, he became a member of the latter Society. He has not engaged in practice since the War, but he has maintained his interest in veterinary affairs with undiminished ardour, except in recent years when the affairs of the town council have had prior claim. He has served on two provisional committees for "National" Congresses at Newcastle and Scarborough, has been a representative of the North of England Division, N.V.M.A., on the "National" Council, and was President of the Division in 1930-31.

Major Taylor is a member of St. Cuthbert's Church, Darlington, where, before the War, he was churchwarden.

Mrs. Taylor is the eldest daughter of the late Mr. J. Carter Thompson, who was a chemist in Darlington. She has lived in the town all her life.

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Retirement Presentation to Lieut.-Colonel H. G. Bowes

The retirement of Lieut.-Colonel H. G. Bowes, F.R.C.V.S., Lecturer in Veterinary Hygiene at the Agricultural Department of the University of Leeds, was marked on Monday last at the Department where the Vice-Chancellor, Sir James Baillie, presented him with a wireless set, a cheque and a bound record of the subscribers to the gifts on behalf of past and present members of the University staff, past and present students of the Agricultural Department, and a large number of people connected with the agricultural industry in Yorkshire. Professor N. M. Comber, head of the Agricultural Department, presided. In addition to members of the staff of the Department other members of the University staff were present.

Emeritus Professor R. S. Seton, formerly head of the Agricultural Department, said that before the War Lieut.-Colonel Bowes came up against a very big problem, a disease which killed off hundreds of rams every year for a number of years. After experiencing great difficulty in collecting evidence of the disease in the Skipton area, he was able to carry out successfully research work which checked it. Professor Seton remarked, amid laughter, that despite Lieut.-Bowes's advice to the farmers, some of them, singularly enough, had persistent faith in the old superstition of hitting the sheep on the head, a form of "cure" which was used in the early days.

Lieut.-Colonel Bowes said his association with the University first began in 1903, and he had had a continuous association with it since 1905. He had seen many changes there. "As far as the investigation and advisory work is concerned," he said, "all I want to say is that I think the work has been of some little benefit to Yorkshire farmers. I hope it will not be long before a successor is appointed to carry on my work. There is always a danger of that connection, that liaison, between the farmers and the University being broken, and of it having to be built up again."

Sir James Baillie said that as a result of his work, Lieut.-Colonel Bowes had won the confidence of the agricultural community of Yorkshire. He knew the inside of a sheep better than most people in the country, and as a result of his investigation he had been able to discover the cause and a cure for certain important and very dangerous diseases.

Lieut.-Colonel Bowes was a practising veterinary surgeon in Leeds before the War, and part-time lecturer at the University in what was then known as "veterinary science." He served with the Army Veterinary Corps during the War, at the beginning of which he went to Canada and the United States as British Remount Officer. On his second journey out he and his family were on the Hesperion when it was torpedoed.

On relinquishing his practice as a veterinary surgeon he accepted the appointment of permanent Lecturer in Veterinary Hygiene at the University, from which he will retire next week, having reached the age limit, 65.

Marriages.—Riggs—MacIver. At Gairloch Hotel, Gairloch, on September 16th, 1937, by the Rev. H. McRury, M.A., Alasdair Riggs, M.R.C.V.S., third son of the late Mr. and Mrs. D. Riggs, Whin Park, Ardross Street, Inverness, to Muriel M. MacIver, M.A., elder daughter of Mr. and Mrs. M. MacIver, Kowloon, Gairloch, Ross-shire.

. . . . . .

Wood-Harvey. Quietly at St. James's, Spanish Place, Marylebone, William Wood, of York, to Eileen Elizabeth Harvey, L.R.C.P., M.R.C.S., daughter of Mr. F. T. Harvey, F.R.C.V.S., and Mrs. Harvey, of Penmellyn, St. Columb, Cornwall.

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R.C.V.S. OBITUARY

Barrow, Harry, Rothery Villa, Ireby, Mealsgate, Cumberland. Graduated New Edinburgh, May 21st, 1901. Died September 16th, 1937; aged 64 years.

Malone, Richard, J.P., Coolree, Wexford, Irish Free State. Graduated New Edinburgh, April 19th, 1877. Died September 22nd, 1937.

* * * * *

THE NEW YEAR AT THE LONDON COLLEGE

Ceremonial Opening and Prize Distribution

It is particularly appropriate that at the commencement of the scholastic year 1937-38 and within a few weeks of the opening of the new buildings by the King, there should have been revived at the Royal Veterinary College, Camden Town, after a lapse of over a quarter of a century, so valuable a feature of its corporate life as an opening ceremony and prize distribution. Certainly the feeling prevalent amongst the representative assembly in the Great Hall of the College on Monday, September 27th, was one of gratification and relief that, at long last, after all the demolition and reconstruction, they were enabled to meet in a college structurally adequate, not only for its more immediate objects, but for the fostering of the community spirit. The Acting Principal, Professor James B. Buxton, introduced Sir Merrik Burrell, Chairman of the Executive Council of the College (who was to present the prizes), and was supported by Professor G. H. Wooldridge, Vice-Principal, and members of the College staff, Lieut.-Colonel P. J. Simpson, President of the Royal College of Veterinary Surgeons, Dr. F. Bullock, Secretary, R.C.V.S., together, amongst other visitors, with Mr. F. T. Harvey, of St. Columb, who provided an interesting link with the "old order" in that he was the first student secretary of the Royal Veterinary College Medical Society.

Professor Buxton, observing that they were met to inaugurate the 146th "year of study in St. Pancras," drew comparison between conditions prevailing in the early years of the existence of that institution—when amongst the difficulties to be overcome were the smells from the Fleet ditch—and those which obtained to-day, with their fine new buildings and equipment. Those responsible in that earlier day had one thing in common with them, however, in that they were very busy trying to raise funds for a large-animal unit. At that time there were four students in residence; last year the number of students was 332, while the number this year was 365.

The Acting Principal proceeded to refer to the disabilities to which both students and staff had been subjected during the recent awkward transitional period of college reconstruction and reorganisation. In the face of that grave handicap, the figures of the successes achieved in the last series of professional examinations were extraordinarily good. In December, 1936, the number of entrants for the examinations was 154, of whom 96 were successful, a percentage of 62. In July of this year, 280 students sat for the examinations, and 174 passed—again a percentage of 62. At the latter examinations, of the 84 students graduating from the affiliated colleges, 30, or 35 per cent. of the whole, were from the Royal Veterinary College. This represented 60 per cent. of the entrants for the final examination from Camden Town, which was 10 per cent. more than were successful in securing their diploma at any other school. The Royal Veterinary College was not the largest numerically; it was, in fact, the third in point of the number of students. But that did not concern either him or the Governors; what did concern them was that they should be able to teach adequately up to their capacity. They had endeavoured to improve the social side of the life of the student body to the full extent within their power. To that end they had provided new accommodation in the form of really comfortable common rooms, a recreation room, and adequate facilities in the refectory. In passing, he must refer to the wonderful work that had been done by Mrs. Maclaren in fitting up the common rooms and the women's rest room. He was particularly anxious that the senior students should play a more active part in the general management of the College, by service on refectory, library and recreations committees, and by appointment as assistant librarians.

In conclusion, Professor Buxton invited Sir Merrik Burrell to present to the students the various College prizes awarded to them during the past year, preceding his remarks under this head by saying that the College had been extraordinarily fortunate in receiving a number of particularly generous gifts. All of these had been acknowledged suitably, with one exception, and that was the very important presentation by Sir Merrik Burrell of the portraits of George III and his Consort, which they would see adorning the wall behind the Chairman's table. Their presence there had a greater significance than that purpose, however, because George III was the reigning monarch when the Royal Veterinary College was founded, and as Elector of Hannover he was responsible for the founding of the Hannover Veterinary School, and it seemed to the speaker inconceivable that George III should not, therefore, have been interested in the founding of the veterinary school in his capital.

Sir Merrik Burrell, having presented the prizes, said that he had felt it his duty to support Professor Buxton on that occasion, but if it was his duty as well as his pleasure to do so, he felt that it was also the duty of the staff and students to give Professor Buxton the fullest possible measure of their support through all the years to follow: he had no easy task, and he could only succeed if all of those present tried to help him and in so doing helped themselves.

That was a very memorable day in his (Sir Merrik's) own life. When many of his hearers were yet infants, he was already trying to think

how they could demolish the old College and provide premises suitable and adequate and of the right kind for a profession as valuable to the country as was theirs. It was a time of great anxiety; they had continually to keep changing their plans according to the extent to which the money was coming in. They had had innumerable obstacles to overcome; these had been overcome to a very large degree, and to-day they were entering upon their studies in the new buildings.

He was that day present as the Chairman of the Executive Council of the College. His address would, he expected, be his "swan song," because he had felt for some time that when that College was started again on new lines, and fresh life had come to it, it would be fitting if such links with the past as he represented were not too much in evidence.

He had always been struck with astonishment at the success achieved by the veterinary Colleges up and down the country in turning out men of high attainment in their profession from institutions so poorly equipped. The effort had now been made successfully to provide the students of the London College with better facilities for learning and a larger and more adequate staff to teach them. He was convinced that it was right that that effort should be made, whatever the cost, in order that their profession might attain those high levels of accomplishment they all wished to see spread more widely amongst its members. He only hoped that that day marked the start of a new order, with ideals of which all the students present would think as they grew older. He had always felt that the way towards improvement was to attract young people of the right class to their profession, to teach them efficiently, and to make the nation recognise the enormous economic value to it of an efficient veterinary service. To this end the owners of animals up and down the country should be imbued with the utmost confidence in the members of their profession, whether scientists or practitioners. The future lay, therefore, in the students' hands: people such as himself and the teaching staff could do no more than give them the opportunities. The Governors had provided them with those new buildings; they were gradually building up an extended and very efficient staff, but they could do no more than paint the words on the finger posts to guide them: it was up to all of them to see that they marched down the road that had been provided. They must see that the work that had been done for them in the past was not wasted; they could only enter into the great future which awaited them by the exercise of their own individual efforts, by which alone could advancement in any profession be possible. Let them make up their minds that they were going to make the Royal Veterinary College the finest, the most respected, veterinary college in the world.

Professor G. H. Wooldridge, Vice-Principal, voiced the thanks of the company to Sir Merrik Burrell for presiding over that ceremony, for his inspiring address, and for presenting the prizes.

The Prizewinners

Coleman Medal

First (Silver)	C. V. Davies

Centenary Prizes

Fifth Year	C. V. Davies
Fourth Year	Miss J. O. Joshua
Third Year	J. F. A. Sprent
Second Year	D. H. Greeves
First Year	A. V. B. Foster

Clinical Prizes

5th Year	First (Silver)	R. C. Crowhurst
	Second (Bronze)	E. T. A. White
4th Year	First (Silver)	C. W. M. Walker
	Second (Bronze)	A. N. Worden
3rd Year	First (Silver)	J. B. Tutt
	Second (Bronze)	G. S. Mason
2nd Year	First (Silver)	D. H. Greeves
	Second (Bronze)	J. K. H. Wilde
1st Year	First (Silver)	J. C. Newhook
	Second (Bronze)	A. V. B. Foster

Class Medals

5th Year	Medicine	1. Silver Medal	F. D. Asplin
		2. Bronze Medal	K. C. Sellers
	Surgery	1. Silver Medal	C. V. Davies
		2. Bronze Medal	F. D. Asplin
4th Year	Pathology	1. Silver Medals	Miss Bingham and Miss Joshua
		2. Bronze Medal	A. N. Worden
	Parasitology	1. Silver Medal	Miss Bingham
		2. Bronze Medal	Miss Joshua
3rd Year	Hygiene	1. Silver Medal	J. B. Tutt
		2. Bronze Medal	J. F. A. Sprent
	Anatomy	1. Silver Medal	J. F. A. Sprent
		2. Bronze Medal	D. W. B. Taylor
	Pharmacology	1. Silver Medal	Miss M. Pocock
		2. Bronze Medal	J. P. Wilmot-Smith
2nd Year	Animal Management	1. Silver Medal	D. H. Greeves
		2. Bronze Medal	E. Cotchin
	Physiology	1. Silver Medal	D. H. Greeves
		2. Bronze Medal	E. Cotchin
	Histology	1. Silver Medal	D. H. Greeves
		2. Bronze Medal	Miss A. F. Russell
1st Year	Biology	1. Silver Medal	H. W. Smith
		2. Bronze Medal	J. C. Newhook
	Chemistry	1. Silver Medals	B. Chandra and J. C. Newhook
		2. Bronze Medal	A. E. Markham

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EXPORTATION OF HORSES

Effect of New Act

The Ministry of Agriculture desires to draw the attention of all persons concerned in the exportation of horses to the provisions of the Exportation of Horses Act, 1937, which came into operation on October 1st, 1937.

The existing regulations contained in the Diseases of Animals Act, 1910, as amended by the Exportation of Horses Act, 1914, prohibit the export of any horse, ass or mule from any port in Great Britain to any port in Europe outside Great Britain, Northern Ireland, the Irish Free State, the Channel Islands, or the Isle of Man, unless immediately before shipment the animal has been examined by a veterinary inspector of the Ministry and certified by him in writing to be capable of being conveyed by sea and disembarked without cruelty, and also to be capable of being worked without suffering. The new Act of 1937 adds to the requisite qualification of fitness to travel and to work without suffering the further qualification that in certain cases specified below, the animal is, in the opinion of the inspector, not more than eight years of age and also of not less value than certain specified amounts. The cases above referred to are where the inspector is satisfied that the animal is: (*a*) a heavy draught horse; (*b*) a vanner, mule or jennet; or (*c*) an ass; and the amounts referred to in relation to (*a*), (*b*) and (*c*) respectively are £25, £20 and £3.

The Act of 1937 provides, however, that the above provisions relating to age and value shall not apply in the case of any animal as to which the inspector is satisfied either:—

(*a*) That it is intended to use the horse as a performing animal, or

(*b*) That the horse is registered in the stud book of a society for the encouragement of horse breeding recognised by the Ministry and is intended to be used for breeding or exhibition, or

(c) That the horse is a foal at foot accompanying such a horse as is referred to in the preceding paragraph (*b*).

The Act of 1937 further provides that if any horse (including ass, mule or jennet) presented to the inspector for examination before shipment is found by him to be in such a physical condition that it is cruel to keep it alive, or to be permanently incapable of being worked without suffering, the inspector must slaughter the animal or cause it to be slaughtered with a mechanically operated instrument, and no compensation is payable to the owner of the animal.

In all other respects the existing regulations continue in operation unchanged and any shipping company or railway company intending to ship horses, asses or mules, to any port or place on the Continent of Europe, outside Great Britain, Northern Island, the Irish Free State, the Channel Islands, or the Isle of Man, must give notice of the intended exportation to the veterinary inspector of the Ministry at the authorised ports of shipment in accordance with the Exportation and Transit of Horses, Asses and Mules Order of 1921. The authorised ports of shipment are London (including Tilbury), Southampton, Folkestone, Harwich, Goole, Hull and Leith.

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	Price net s. d.	*Post free* s. d.
HEALTH, MINISTRY OF:		
Food Memoranda 62a/Foods. Meat Inspection. Supplementary Memorandum. September, 1937. (32-9999.) ...	0 1	0 1½
STATUTORY RULES AND ORDERS, 1937:		
794. Animal. Diseases of Animals. The Foreign Hay and Straw (Amendment) Order (No. 4), dated August 25th, 1937.	0 1	0 1½
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144/37. Slaughter of Cattle and Sheep (Application for Manufacturing Licences) Regulations, 1937.	0 2	0 0½
153/37. Slaughter of Animals Act, 1935 (Date of Commencement) (No. 2.) Order, 1937.	0 1½	0 0½
154/37. Game Birds Protection (No. 1) Order, 1937	0 1½	0 0½

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ARMY VETERINARY SERVICE

LONDON GAZETTE—WAR OFFICE—REGULAR ARMY

Sept. 28th.—Maj. D'A. S. Beck retires on ret. pay (September 28th).

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ANTI-GAS TRAINING

The Air Raid Precautions Memorandum No. 5, on "Anti-Gas Training," has been issued by the Home Office (the Stationery Office, price 4d. net.). This memorandum summarises in convenient form the more important information which has already been issued in a series of circulars.

The memorandum outlines the suggested organisation and arrangements for local anti-gas training. It points out that the first civilian anti-gas school, opened at Eastwood Park, Falfield, Gloucestershire, in April, 1936, has residential accommodation for 60 students, and that a second school, of similar size, will be opened at the Hawkhills, Easingwold, near York, this year. The cost of the schools, it is stated, is borne by the Government, and no charge is made to students who come from any part of Great Britain except a charge of 6s. a day for food and the wages of the mess staff, plus a subscription not exceeding 2s. for the course to cover the cost of newspapers, notepaper, etc. Women students are taken as well as men in certain courses.

The main function of the schools is to train instructors who should, on their return to their respective districts, give instruction to members of air-raid precaution services, as well as lectures and instruction to such members of the general public as may be interested. The memorandum gives some details of the instructors' course; and a chapter is devoted to the question of providing anti-gas instruction for medical, dental, and veterinary practitioners, students and nurses.

* * * * *

WORLD-WIDE MALNUTRITION

Speaking in the Second Committee of the League Assembly at Geneva on Wednesday of last week, on the Report of the Mixed Committee on Nutrition, Mr. Robert Bernays, M.P., Parliamentary Secretary of the Ministry of Health, said that he was personally especially interested in the references therein to the extent of malnutrition that existed outside Europe. He felt sure that the committee would agree that there was a tendency in League discussions to examine problems of health and economics too exclusively from the European angle: in this Report they got some idea of the unsatisfactory position with regard to nutrition in Asia and Africa.

Having travelled fairly extensively in both these continents, he could speak with some practical knowledge of the extent of undernourishment in those regions. In India there were probably millions of people who could not afford more than one meal a day; in China, according to the reply of the Chinese Government to a questionnaire by the Mixed Committee, "most Chinese are in a state of malnutrition all the time," and from his own personal experience as one who had been fortunate enough to be a member of a Commission that visited tropical Africa this spring he could emphasise how acute there was the problem of undernourishment.

Coming nearer home, Mr. Bernays said, he would like to say a word for comparative purposes on what we were doing in the United Kingdom. One of the most valuable objects of the committee was to pool our knowledge and ideas with a view to discovering what line of progress in the country of our neighbours can best be followed up and adapted to the conditions in our own territories. Some months ago, the Advisory Committee on Nutrition had issued a first report, and following on that report maternity and child welfare authorities had been urged to review their arrangements for the supply of milk and food to expectant and nursing mothers and young children, so as to ensure that those in need of additional nourishment are able to secure it. Moreover, legislation was promised in the coming session of Parliament with a view to increasing consumption of milk among these classes.

The Report of the Mixed Committee urged the need for adaptation of agriculture in the direction of the provision of larger quantities of protective foods, particularly in European and certain other countries of Western civilisation. So far as Great Britain was concerned, the last half century had been one of striking change in the scope and character of agricultural production. Gone was the time when it was predominantly an arable country, producing a large proportion of its requirements of wheat and other cereals. To-day Great Britain was dependent to a very high degree for its supply of cereals on imports from overseas. The great bulk of its domestic production now consisted of milk, livestock, poultry, eggs, fruit and vegetables. He would like to illustrate this transition with a few figures. The number of acres under cereals had declined since the seventies of last century from approximately 8,400,000 acres to approximately 4,900,000 to-day. Coincident with this decline there had been a remarkable increase in the production of milk, which was to-day by far the most important single product of British agriculture. The number of dairy cows in the country had increased from approximately 2,200,000 sixty years ago to no less than 3,500,000 to-day. The number of poultry had increased from 36,700,000 in 1908, to 63,700,000 in the present year. As a result of all these changes the production of milk, butter, cheese and eggs, for example, had more than trebled since 1908. These figures were sufficient to show that in response to changing demand and to changing circumstances governing food production, there had been a continuous and very substantial change in the direction which the Report of the Mixed Committee desired.

Concluding, Mr. Bernays said that he felt, after reading this searching analysis of the Mixed Committee, that we were on the threshold of great developments. This Report and the interim Report that preceded it might well play as vital a part in calling attention to the great problem of malnutrition as in the United Kingdom the Poor Law Commission of 1909 played in attacking the problem of poverty.

He noted with especial interest in Lord Astor's speech his suggestion that the experiment of a conference of national nutrition committees at Geneva should be repeated and become an annual event. The object of these reunions was principally to develop and maintain mutual interest in national nutrition schemes and to assist and stimulate countries to improve the nutrition standard of their people. This was a proposal which he thought should be given the most careful consideration. It was most important that the impetus given by the Report of the Mixed Committee should not be allowed to slacken but should rather be made, as the years go by, to gather momentum.

* * * * *

DANGEROUS DRUGS

A Government report to the League of Nations on the traffic in opium and other dangerous drugs during 1936 states that addiction to narcotic drugs is not prevalent in the United Kingdom. The approximate number of addicts in the country known to the Central Office at the end of last year was 616, of whom 313 were men and 303 women. Of this total approximately 137 were members of the medical profession, three were dentists, five were pharmacists, and two veterinary surgeons. The drugs involved were morphine and preparations, 543; heroin, 61; cocaine, 52; and combined drugs, 50. The report covers Great Britain, Northern Ireland, the Isle of Man, and the Channel Islands.

During the year, the report states, nine members of the medical profession, one dentist, one pharmacist, and one veterinary surgeon were convicted of offences against the Dangerous Drugs Acts. In nine of the cases in which convictions were recorded the authorisation of the convicted person was withdrawn.

In a comment on the control of international trade it is submitted that, in general, the system of import certificates and export authorisations for the control of imports and exports of opium and other dangerous drugs has worked satisfactorily, though in a few cases difficulty still arises owing to the use of languages other than the official languages of the League of Nations.

No evidence was forthcoming of any organised illicit traffic in the United Kingdom during 1936. Such cases of illicit import of drugs as were discovered were individual attempts usually on the part of seamen, mainly Orientals, to bring in small quantities for their own use or that of compatriots resident in the United Kingdom. The number of cases of illicit import or unauthorised possession in which opium—both raw and prepared—was the drug concerned, has decreased from eleven in 1935 to ten in 1936, and the amount seized by the Customs authorities was 9 kgs. in 1936, as compared with 12 kgs. in 1935. With regard to Indian hemp, the number of cases of illicit import or unauthorised possession was eight in 1936, compared with 14 in the preceding year. The amount of the drug seized was 1 kg. Most of the prosecutions undertaken during the year were in respect of breaches of the Dangerous Drugs Acts and Regulations and not in respect of trafficking.

Dangerous drugs imported into Great Britain during 1936 were as follows:—

Raw opium, 248,850 lb.; medicinal opium, 11 lb.; coca leaves, 110,821 lb.; Indian hemp, 1,734 lb.; crude morphine, 19,144 lb.; morphine, 347 lb.; diacetylmorphine, 44 lb.; cocaine, 7·6 lb.; crude methylmorphine, 3,265 lb.; methylmorphine, 99 lb.; and ethyl-morphine, 29 lb.

Exports of raw opium from the United Kingdom totalled 119,227 lb., compared with 59,933 lb. in 1935.

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Erratum.—In Captain O. V. Gunning's opening of the discussion on Mr. R. H. Smythe's paper to Congress, N.V.M.A., "The Clinical Aspects and Treatment of 'Hoose' (Parasitic) and Allied Conditions in Cattle," in the sentence at top of column 2, page 1229: "If a calf with parasitic lung affection refuses to cough it must immediately be put back on the pail," *for* "cough" *read* "trough."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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"SKILLED HORSEMANSHIP"

To the Editor of the Veterinary Record

Sir,—In your review of "Skilled Horsemanship" by Lieut.-Colonel S. G. Goldschmidt (*Veterinary Record* of July 24th) exception is taken to the author's observation that women as a whole have better hands than men. If the reviewer is correct in his objection it can only be because he is a young man and because women have changed for the worse in this respect in recent years. I have never liked women in the hunting field and certainly no one could convict me of gallantry in this connection, but I am reluctantly compelled to admit that most of the horsewomen I have known have on the whole had lighter hands than men.

In that hard school of horsemanship, the Irish hunting field of pre-War days, it was a commonplace that the hot-headed "four-year-old" usually went more kindly with a woman than a man if she could ride him at all. Indeed, if her hands had not been good her strength could never have held him in a country where the plain snaffle used to be the rule on a young horse. And she could and did hold him. I rode my first hunt in 1893 and my last in 1933 and during the whole of that time I and my contemporaries agreed that when a woman could ride at all she generally had lighter hands than a man.

It occurs to me that the difference of opinion between your reviewer and his critics may be solved scientifically without discredit to either party. It may be that the recent change from the side-saddle to the astride mode has adversely affected the female hands. It is recognised that an uncertain seat makes for poor hands and that the female form is not always at its best functionally or structurally in a man's saddle. My reminiscences and no doubt those of Lieut.-Colonel Goldschmidt do not apply so much to the equestrienne misfits that have so distressingly increased of late years, as to the taut and trim, if exigent, side-saddle experts of our youth and middle age.

There is, however, one department of horsemanship in which the hunting woman is very definitely inferior to the man and I am surprised that Lieut.-Colonel Goldschmidt has not mentioned it. I refer to the inconsiderate treatment given by most women to horses on the way home from hunting. The very moment that the shouting and the tumult die, and especially when the Captains and the Kings depart, the average woman streaks for home as fast as she can go on the horse if there is no car to take her. Considerate male horsemen have all occasionally hated women for having to accompany them on this desperate homeward journey instead of being able to take the tired horse home at his own pace. There may be, and no doubt there sometimes is, a good physiological reason for this female behaviourism but it is certainly hard on the horse. I have reason to think that Colonel Goldschmidt and I have discussed the point in harmony when we were fellow sufferers with our horses returning from a hard day's hunting.

Yours faithfully,
Wakefield Rainey.

c/o Union Bank of Australia,
Perth,
Western Australia.
August 22nd, 1937.

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THE OPERATION FOR "ROARING"

To the Editor of the Veterinary Record

Sir,—I am interested in Mr. Chambers' communication on "Roaring," and desire to put forward the following points:—

(1) It was, in my view, bad policy to give way to a client and apply counter-irritation, thereby losing a month or so.

(2) Why give a large dose of chloral? If it had effect the animal would remain too long under the influence of the drug, which is very undesirable.

(3) Why use chloroform? The operation can be easily performed under a local anaesthetic.

(4) The depth of the larynx should cause no difficulty if the "burr" used is long enough.

My experience as operating surgeon in a veterinary hospital in France during the War, soon showed me that this operation should be performed under a local anaesthetic. It saved time, the animal was less perturbed and there was less risk of the horse collapsing.

Yours faithfully,
W. A. Smith.

Oaklands,
Boyle.
September 27th, 1937.

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INCIDENCE OF TUBERCULOSIS IN COWS IN DEVONSHIRE

To the Editor of the Veterinary Record

Sir,—In your number of August 14th, Dr. J. R. Harper is reported to have made the following statement at a meeting of the Devon Public Health Committee: "Roughly over 80,000 cows had been inspected by the veterinary department and it was found that less than 1·5 per thousand were tuberculous." In other words, this would mean that there would be less than 120 tuberculous cows in the 80,000 inspected. Devonshire must indeed be quite unique.

Yours, etc.,
Graham Rees-Mogg.

42, Princes Gate,
S.W.7.
September 23rd, 1937.

The Editor acknowledges the receipt of the following:—

Reports of meetings of the Royal Counties and the Western Counties Divisions, N.V.M.A., from Mr. H. Bell and Captain S. J. Motton, respective Honorary Secretaries.

Communications from Major R. M. Bamford (Porton), Messrs. E. B. D. Hall (Wiveliscombe), V. Berwyn Jones (Guildford), and C. A. Keatinge (Portadown, N. Ireland).